



Eduardo Martin Guerrero de Escalante

Generado desde: Editor CVN de FECYT

Fecha del documento: 23/03/2021

v 1.4.3

dbdc074ab303eebf59d8910d769445b0

Este fichero electrónico (PDF) contiene incrustada la tecnología CVN (CVN-XML). La tecnología CVN de este fichero permite exportar e importar los datos curriculares desde y hacia cualquier base de datos compatible. Listado de Bases de Datos adaptadas disponible en <http://cvn.fecyt.es/>



Resumen libre del currículum

Descripción breve de la trayectoria científica, los principales logros científico-técnicos obtenidos, los intereses y objetivos científico-técnicos a medio/largo plazo de la línea de investigación. Incluye también otros aspectos o peculiaridades importantes.

Según Google Scholar mi índice h es 82. Este buscador ha encontrado 648 publicaciones en las que aparezco como co-autor que han recibido 20053 citas hasta la fecha.

A continuación se puede encontrar un breve resumen (en inglés) de mi actividad investigadora:

I have served in the management committees of 3 european FP6 networks named: ARENA, CONSTELLATION and ROPACS.

I served in the following committees: CAB representative in the CARMENES Science Team (2015-2018); Spanish representative in the ORIGINS COST consortium management committee (2014-2018); Independent Legacy Scientist in the Euclid mission Science Team (2012- present); the European Southern Observatory (ESO) Observing Program Committee (2015-2017) and NASA Chandra X-ray Observatory (2010). I also served as external evaluator of proposals to the following agencies: ANEP, ICREA, INSU, Swiss NSF; and as referee for the following journals: Astronomy and Astrophysics, Monthly Notices of the Royal Astronomical Society, The Astronomical Journal, and The Astrophysical Journal.

I have delivered many invited talks, including the following: 50th anniversary conference of doctoral degrees in Astrophysics at the Universidad de La Laguna, Spain, May 2019; Gender in Physics Day, IAC, October 2017; 400 years of stellar rotation conference, November 2013, Natal, Brazil; 41th meeting of Mexican Planetaria, September 2013, Puebla, Mexico; ASSG2013: Asteroid Spectroscopy in support of GAIA, June 2013, Nice, France; "Hot Planets and Cool Stars" conference, November 2012, Munich; Introduction at Fundación BBVA for public talk by Didier Queloz, Madrid, May 2012; Gordon Research Conference on Origin of Life, Galveston, Texas, January 2012; Colloquium speaker, University of Central Florida, Physics Dept., October 2011; Invited seminar at Pennstate University, November 2011; Invited Seminar, Institut de Sciences de l'Univers. Barcelona, July 2011; Invited speaker, Santa Fe community college, Florida, June 2011; Colloquium speaker, University of Florida, Astronomy and Physics Depts., March 2011;

Invited speaker at the Annual Conference of the Ass. of Physics Professors, Jacksonville, Florida, Jan. 2011; First Science Meeting "Vista Variable Survey", Viña del Mar, Chile, December 2010; Invited Seminar, International University of Vietnam. Ho Chi Minh City, November 2010; Invited Speaker, Arcetri Astrophysical Observatory, Florence, Italy, October 2010; Invited professor of the NASA Astrobiology Institute and the Escuela Internacional Menéndez Pelayo Extrasolar Planets and Habitability, Santander, June 2010; Outreach conference. Biblioteca Pública de Puerto del Rosario, Fuerteventura, Islas Canarias, May 2010; Invited Seminar, Courses College de France, Grenoble, April 2010.

I have supervised the following postdocs: Ramarao Tata, postdoc at IAC, 2009-2011; Phan Bao Ngoc, postdoc at UCF, 2007 – 2009; Hervé Bouy, postdoc at IAC, 2008 – 2011; Nicolas Lodieu, postdoc at IAC, 2007 – 2009; Antonio García López, postdoc at IAC, 2009 – 2011; Florian Rodler, postdoc at IAC, 2009 – 2011; Basmah Riaz, postdoc at IAC, Spain



2007 – 2009; Mari Cruz Gálvez, postdoc at CAB, 2011 – 2014; Belen López Martí, postdoc at CAB 2016 – 2017.

I have served as member in the PhD juries of Anthony Burgess (Université de Grenoble), Franck Galland (Université de Geneva), Pedro Vieira Almeida (Universidade de Porto) and Melissa Hobson (Université de Marseille).



Indicadores generales de calidad de la producción científica

Descripción breve de los principales indicadores de calidad de la producción científica (sexenios de investigación, tesis doctorales dirigidas, citas totales, publicaciones en primer cuartil (Q1), índice h....). Incluye también otros aspectos o peculiaridades importantes.

Índice $h = 82$ según Google Scholar. Hirsch, el creador de este índice, reconoce que después de 20 años de labor de investigación, un índice $h = 20$ es **bueno**, 40 es sobresaliente, y 60 es verdaderamente excepcional. La gran ventaja del índice h es que combina productividad e impacto en sólo una cifra.

Eduardo Martin Guerrero de Escalante

Apellidos: **Martin Guerrero de Escalante**
Nombre: **Eduardo**
ORCID: **0000-0002-1208-4833**
Fecha de nacimiento: **10/08/1964**
Sexo: **Hombre**
Nacionalidad: **España**
País de nacimiento: **España**
C. Autón./Reg. de nacimiento: **Canarias**
Ciudad de nacimiento: **San Cristóbal de La Laguna**
C. Autón./Reg. de contacto: **Canarias**
Teléfono fijo: **(+34) 666533725**
Correo electrónico: **ege@iac.es**
Teléfono móvil: **666533725**
Página web personal: **www.substellar.net**

Situación profesional actual

Entidad empleadora: Consejo Superior de Investigaciones Científicas **Tipo de entidad:** Agencia Estatal
Departamento: Centro de Astrobiología
Categoría profesional: Profesor de Investigación
Fecha de inicio: 15/05/2009
Modalidad de contrato: Funcionario/a **Régimen de dedicación:** Tiempo completo
Primaria (Cód. Unesco): 210000 - Astronomía y Astrofísica
Funciones desempeñadas: Investigador y coordinador de grupo
Identificar palabras clave: Física y ciencias del espacio

Cargos y actividades desempeñados con anterioridad

| | Entidad empleadora | Categoría profesional | Fecha de inicio |
|---|--------------------------------------|------------------------|-----------------|
| 1 | University of Florida | Profesor adjunto | 01/09/2012 |
| 2 | University of Central Florida | Profesor adjunto | 01/09/2005 |
| 3 | Instituto de Astrofísica de Canarias | Investigador principal | 15/05/2004 |
| 4 | Universidad de Hawaii | Profesor | 15/05/2000 |
| 5 | Caltech | Postdoctoral scholar | 15/05/1999 |
| 6 | University of California at Berkeley | Postdoctoral associate | 15/05/1997 |
| 7 | Instituto de Astrofísica de Canarias | Astrónomo de soporte | 15/05/1994 |

1 Entidad empleadora: University of Florida **Tipo de entidad:** Universidad
Departamento: Geology and Space Science, Collegue of Arts & Sciences
Ciudad entidad empleadora: Gainesville, Estados Unidos de América
Categoría profesional: Profesor adjunto **Gestión docente (Sí/No):** Si



Fecha de inicio-fin: 01/09/2012 - 01/12/2015 **Duración:** 2 años - 2 meses
Modalidad de contrato: visitante
Funciones desempeñadas: Investigación básica y seminarios para estudiantes de doctorado
Ámbito actividad de gestión: Universitaria

- 2 Entidad empleadora:** University of Central Florida
Tipo de entidad: Universidad
Departamento: Física
Ciudad entidad empleadora: Orlando, Estados Unidos de América
Categoría profesional: Profesor adjunto **Gestión docente (Sí/No):** Si
Fecha de inicio-fin: 01/09/2005 - 01/09/2011 **Duración:** 6 años
Modalidad de contrato: visitante
Funciones desempeñadas: Investigación básica, cursos y supervisión de estudiantes de doctorado
Ámbito actividad de gestión: Universitaria
- 3 Entidad empleadora:** Instituto de Astrofísica de Canarias **Tipo de entidad:** Organismo Público de Investigación
Categoría profesional: Investigador principal
Fecha de inicio-fin: 15/05/2004 - 15/05/2009 **Duración:** 5 años
- 4 Entidad empleadora:** Universidad de Hawaii **Tipo de entidad:** Universidad
Categoría profesional: Profesor
Fecha de inicio-fin: 15/05/2000 - 15/05/2004 **Duración:** 4 años
- 5 Entidad empleadora:** Caltech **Tipo de entidad:** Centros de Innovación y Tecnología
Categoría profesional: Postdoctoral scholar
Fecha de inicio-fin: 15/05/1999 - 15/05/2000 **Duración:** 1 año
- 6 Entidad empleadora:** University of California at Berkeley
Categoría profesional: Postdoctoral associate
Fecha de inicio-fin: 15/05/1997 - 15/05/1999 **Duración:** 2 años
- 7 Entidad empleadora:** Instituto de Astrofísica de Canarias **Tipo de entidad:** Organismo Público de Investigación
Categoría profesional: Astrónomo de soporte **Gestión docente (Sí/No):** No
Fecha de inicio-fin: 15/05/1994 - 15/05/1997 **Duración:** 3 años
Modalidad de contrato: Contrato laboral temporal



Formación académica recibida

Titulación universitaria

Estudios de 1º y 2º ciclo, y antiguos ciclos (Licenciados, Diplomados, Ingenieros Superiores, Ingenieros Técnicos, Arquitectos)

Titulación universitaria: Titulado Superior

Nombre del título: Licenciado en Ciencias Físicas Especialidad Astrofísica

Ciudad entidad titulación: San Cristóbal de La Laguna, España

Entidad de titulación: Universidad de La Laguna **Tipo de entidad:** Universidad

Fecha de titulación: 15/07/1988

Título homologado: No

Doctorados

Programa de doctorado: Astrofísica y cosmología

Entidad de titulación: Universidad de La Laguna **Tipo de entidad:** Universidad

Ciudad entidad titulación: San Cristóbal de La Laguna, Canarias, España

Fecha de titulación: 25/01/1994

Título de la tesis: Evolución temprana de estrellas poco masivas y objetos en el límite subestelar

Director/a de tesis: Rafael Rebolo López

Calificación obtenida: Apto cum laude

Conocimiento de idiomas

| Idioma | Comprensión auditiva | Comprensión de lectura | Interacción oral | Expresión oral | Expresión escrita |
|---------|----------------------|------------------------|------------------|----------------|-------------------|
| Inglés | A1 | A1 | A1 | A1 | A1 |
| Francés | A1 | A1 | A1 | A2 | A2 |
| Alemán | C2 | C2 | C2 | C2 | C2 |

Actividad docente



Dirección de tesis doctorales y/o proyectos fin de carrera

- 1 Título del trabajo:** Seguimiento de las trayectorias de los objetos de masa planetaria más fríos y cercanos
Tipo de proyecto: Proyecto Final de Carrera
Entidad de realización: Universidad de La Laguna **Tipo de entidad:** Universidad
Ciudad entidad realización: San Cristóbal de La Laguna, Canarias, España
Alumno/a: Juan Villafañe Calvo
Calificación obtenida: 8.8
Fecha de defensa: 22/03/2021
- 2 Título del trabajo:** Identificación y caracterización de estrellas poco masivas y enanas marrones con el observatorio virtual
Tipo de proyecto: Tesis Doctoral
Codirector/a tesis: Enrique Solano Marquez
Entidad de realización: Universidad Complutense de Madrid **Tipo de entidad:** Universidad Madrid
Ciudad entidad realización: Madrid, Comunidad de Madrid, España
Alumno/a: Miriam Aberasturi Vega
Calificación obtenida: Cum Laude
Fecha de defensa: 16/11/2015
- 3 Título del trabajo:** Una búsqueda de objetos de baja masa en regiones de formación estelar
Tipo de proyecto: Tesis Doctoral
Codirector/a tesis: Cédric Nicolas; David Barrado Navascués
Entidad de realización: Universidad de La Laguna **Tipo de entidad:** Universidad
Ciudad entidad realización: San Cristóbal de La Laguna, Canarias, España
Alumno/a: Manuel Perger
Fecha de defensa: 11/12/2013
- 4 Título del trabajo:** Caracterización de atmósferas de exoplaneta a través de tránsitos
Tipo de proyecto: Tesis Doctoral
Entidad de realización: Universidad de La Laguna **Tipo de entidad:** Universidad
Ciudad entidad realización: San Cristóbal de La Laguna, Canarias, España
Alumno/a: Felipe Murgas Alcaíno
Calificación obtenida: Cum Laude
Fecha de defensa: 04/12/2013
- 5 Título del trabajo:** Search for gas giants around late-M dwarfs
Tipo de proyecto: Tesis Doctoral
Entidad de realización: University of Central Florida **Tipo de entidad:** Universidad
Ciudad entidad realización: Orlando, Estados Unidos de América
Alumno/a: Rohit Deshpande
Calificación obtenida: Pass with merit
Fecha de defensa: 20/08/2010
- 6 Título del trabajo:** Búsqueda de discos protoplanetarios en enanas marrones y exoplanetas alrededor de enanas marrones
Tipo de proyecto: Tesis Doctoral
Entidad de realización: Universidad de La Laguna **Tipo de entidad:** Universidad



Ciudad entidad realización: San Cristóbal de La Laguna, Canarias, España
Alumno/a: Luisa Valdivielso Casas
Calificación obtenida: Cum Laude
Fecha de defensa: 16/07/2010

7 Título del trabajo: Search, characterization and properties of brown dwarfs
Tipo de proyecto: Tesis Doctoral
Entidad de realización: University of Central Florida **Tipo de entidad:** Universidad
Ciudad entidad realización: Orlando, Estados Unidos de América
Alumno/a: Ramarao Tata
Calificación obtenida: Pass with merit
Fecha de defensa: 27/11/2009

8 Título del trabajo: Las enanas marrones y planetas aislados en cúmulos jóvenes: caracterización, evolución y función de masas
Tipo de proyecto: Tesis Doctoral
Codirector/a tesis: Rafael Reboló López
Entidad de realización: Universidad de La Laguna **Tipo de entidad:** Universidad
Ciudad entidad realización: San Cristóbal de La Laguna, Canarias, España
Alumno/a: Víctor Sánchez Béjar
Calificación obtenida: Apto cum laude
Fecha de defensa: 12/01/2001

Experiencia científica y tecnológica

Actividad científica o tecnológica

Proyectos de I+D+i financiados en convocatorias competitivas de Administraciones o entidades públicas y privadas

1 Nombre del proyecto: Enanas marrones como análogos de exoplanetas
Modalidad de proyecto: De investigación fundamental (incluyendo excavaciones arqueológicas, etc.). **Ámbito geográfico:** Nacional
Grado de contribución: Investigador/a
Entidad de realización: Instituto de Astrofísica de Canarias **Tipo de entidad:** Organismo Público de Investigación
Ciudad entidad realización: San Cristóbal de La Laguna, Canarias, España
Nombres investigadores principales (IP, Co-IP,...): Nicolas Lodieu; Víctor Sánchez Béjar; Eduardo Martín Guerrero de Escalante
Nº de investigadores/as: 3 **Nº de personas/año:** 4
Tipo de participación: Miembro de equipo
Cód. según financiadora: PID2019-109522GB-C53
Fecha de inicio-fin: 01/06/2020 - 31/05/2023 **Duración:** 3 años
Cuantía total: 108.000 € **Cuantía subproyecto:** 108.000 €
Régimen de dedicación: Tiempo parcial
Aportación del solicitante: Preparación del legado científico de Euclid en el ámbito de las enanas ultrafrías.



- 2** **Nombre del proyecto:** Enanas ultrafrías: Un eslabón único entre estrellas y planetas
Modalidad de proyecto: De investigación fundamental (incluyendo excavaciones arqueológicas, etc.). **Ámbito geográfico:** Nacional
Grado de contribución: Coordinador del proyecto total, red o consorcio
Entidad de realización: Centro de Astrobiología **Tipo de entidad:** Agencia Estatal
Ciudad entidad realización: Torrejón de Ardoz, Canarias, España
Nombres investigadores principales (IP, Co-IP,...): Eduardo Martín Guerrero de Escalante
Nº de investigadores/as: 5 **Nº de personas/año:** 5
Entidad/es financiadora/s: Ministerio de Ciencia e Innovación **Tipo de entidad:** Feder
Tipo de participación: Coordinador
Cód. según financiadora: AYA2015-69350-C3-1-P
Fecha de inicio-fin: 01/01/2016 - 31/12/2020 **Duración:** 5 años
Entidad/es participante/s: Centro de Astrobiología; Instituto de Astrofísica de Canarias; Universidad Politécnica de Cartagena
Cuantía total: 132.737 €
Aportación del solicitante: Coordinador del proyecto e investigador principal del subproducto en el CAB
- 3** **Nombre del proyecto:** Infrared spectroscopy of young free-floating planets
Entidad de realización: University of Florida
Ciudad entidad realización: Gainesville, Estados Unidos de América
Nombres investigadores principales (IP, Co-IP,...): Eduardo Martín; Maria Rosa Zapatero Osorio
Nº de investigadores/as: 2
Entidad/es financiadora/s: NASA-JPL
Ciudad entidad financiadora: Pasadena, Estados Unidos de América
Fecha de inicio-fin: 01/09/2013 - 01/08/2015
Cuantía total: 15.000 €
- 4** **Nombre del proyecto:** CARMENES-CAB: Exoplanetas, enanas marrones y estrellas de baja masa
Modalidad de proyecto: De investigación fundamental (incluyendo excavaciones arqueológicas, etc.). **Ámbito geográfico:** Nacional
Grado de contribución: Investigador/a
Entidad de realización: Centro de Astrobiología **Tipo de entidad:** Agencia Estatal
Ciudad entidad realización: Torrejón de Ardoz, Comunidad de Madrid, España
Nombres investigadores principales (IP, Co-IP,...): Jose Antonio Caballero; Eduardo Martín; Maria Rosa Zapatero Osorio
Nº de investigadores/as: 7 **Nº de personas/año:** 7
Tipo de participación: Miembro de equipo
Cód. según financiadora: AYA2011-30147-C03-03
Fecha de inicio-fin: 01/01/2012 - 31/07/2015 **Duración:** 3 años - 7 meses
Cuantía total: 215.000 €
Resultados relevantes: Participación en el desarrollo y preparación de la explotación de CARMENES
Régimen de dedicación: Tiempo completo
- 5** **Nombre del proyecto:** ROPACS (Rocky Planets Around Cool Stars)
Modalidad de proyecto: De investigación y desarrollo incluida traslacional **Ámbito geográfico:** Unión Europea



Grado de contribución: Coordinador/a gerente
Entidad de realización: University of Hertsfordshire
Ciudad entidad realización: Hatfield, Reino Unido
Nombres investigadores principales (IP, Co-IP,...): David Pinfield; Eduardo Martín; Roberto Saglia; Yakiv Pavlenko; David Barrado Navascués
Nº de investigadores/as: 85 **Nº de personas/año:** 60
Tipo de participación: Coordinador
Nombre del programa: European Initial Training Network
Cód. según financiadora: Grant agreement ID: 213646
Fecha de inicio-fin: 01/12/2008 - 30/11/2012 **Duración:** 4 años
Cuantía total: 3.211.716 €
Resultados relevantes: Formación de 15 investigadores jóvenes en el ámbito de la ciencia y tecnología de exoplanetas
Régimen de dedicación: Tiempo parcial
Aportación del solicitante: Coordinador del nodo en el Instituto de Astrofísica de Canarias y miembro del comité de gestión de todo el proyecto.

6 Nombre del proyecto: Detección de exoplanetas telúricos con espectrógrafos de muy alta resolución espectral en telescopios de gran diámetro

Modalidad de proyecto: De demostración, proyectos piloto, de formulación conceptual y diseño de productos y de procesos o servicios **Ámbito geográfico:** Nacional

Grado de contribución: Coordinador del proyecto total, red o consorcio

Entidad de realización: Instituto de Astrofísica de Canarias **Tipo de entidad:** Organismo Público de Investigación

Ciudad entidad realización: San Cristobal de La Laguna, Canarias, España

Nombres investigadores principales (IP, Co-IP,...): Eduardo Martín

Nº de investigadores/as: 8 **Nº de personas/año:** 8

Entidad/es financiadora/s: Ministerio de Ciencia e Innovación. Investigación **Tipo de entidad:** FEDER

Tipo de participación: Coordinador

Cód. según financiadora: AYA2007-67458

Fecha de inicio-fin: 01/10/2007 - 31/03/2011 **Duración:** 3 años - 6 meses

Cuantía total: 560.000 €

Resultados relevantes: Estudio científico técnico que sirvió de germen para el consorcio CARMENES

Régimen de dedicación: Tiempo completo

Aportación del solicitante: Coordinador

7 Nombre del proyecto: MARIE CURIE EC RTN CONSTELLATION The Origin of Stellar Masses

Modalidad de proyecto: De investigación fundamental (incluyendo excavaciones arqueológicas, etc.) **Ámbito geográfico:** Unión Europea

Grado de contribución: Coordinador/a gerente

Entidad de realización: Universidad de Exeter **Tipo de entidad:** Universidad

Ciudad entidad realización: Exeter, Reino Unido

Nombres investigadores principales (IP, Co-IP,...): Mark McCaughrean; Philip André; Gilles Chabrier; Eduardo Martín; Hans Zinnecker

Nº de investigadores/as: 29 **Nº de personas/año:** 20

Tipo de participación: Coordinador

Nombre del programa: Comisión Europea FP6-mobility

Fecha de inicio-fin: 01/12/2006 - 30/11/2010 **Duración:** 4 años



Entidad/es participante/s: Academy of Sciences Czech Republic; Astrophysikalische Institut Postdam; Commissariat a l'Energie Atomique; Ecole Normale Supérieure de Lyon; Instituto de Astrofísica de Canarias; Observatorio de Arcetri; University of Cardiff

Cuantía total: 3.409.322 €

Régimen de dedicación: Tiempo parcial

Aportación del solicitante: Coordinador del nodo español con base en el Instituto de Astrofísica de Canarias

8 Nombre del proyecto: An infrared radial velocity search for planets

Modalidad de proyecto: De investigación fundamental (incluyendo excavaciones arqueológicas, etc.). **Ámbito geográfico:** Internacional no UE

Grado de contribución: Coordinador del proyecto total, red o consorcio

Entidad de realización: University of Central Florida **Tipo de entidad:** Universidad

Ciudad entidad realización: Orlando, Estados Unidos de América

Nombres investigadores principales (IP, Co-IP,...): Eduardo Martín

Nº de investigadores/as: 4

Nº de personas/año: 4

Entidad/es financiadora/s:

NASA Jet Propulsion Laboratory

Tipo de entidad: Agencia Estatal

Ciudad entidad financiadora: Pasadena, Estados Unidos de América

Tipo de participación: Investigador principal

Fecha de inicio-fin: 01/01/2006 - 30/05/2007

Duración: 1 año - 6 meses

Cuantía total: 21.900 €

Resultados relevantes: Búsqueda de exoplanetas en estrellas de tipo M tardío con el telescopio Keck

Régimen de dedicación: Tiempo parcial

Aportación del solicitante: Investigador principal

9 Nombre del proyecto: Fundamental properties of L dwarfs in binaries

Modalidad de proyecto: De investigación fundamental (incluyendo excavaciones arqueológicas, etc.).

Grado de contribución: Coordinador del proyecto total, red o consorcio

Entidad de realización: Institute for Astronomy of the University of Hawaii **Tipo de entidad:** Centros de Innovación y Tecnología

Ciudad entidad realización: Honolulu, Estados Unidos de América

Nombres investigadores principales (IP, Co-IP,...): Eduardo Martín

Nº de investigadores/as: 4

Entidad/es financiadora/s:

Space Telescope Science Institute

Tipo de entidad: Agencia Estatal

Ciudad entidad financiadora: Baltimore, Estados Unidos de América

Tipo de participación: Investigador principal

Fecha de inicio-fin: 01/09/2001 - 01/08/2006

Duración: 4 años - 11 meses

Cuantía total: 79.748 €

Régimen de dedicación: Tiempo parcial

Aportación del solicitante: Investigador principal de un proyecto para obtener, analizar e interpretar datos del telescopio espacial Hubble.

10 Nombre del proyecto: Detection and characterization of brown dwarfs and free-floating planets

Modalidad de proyecto: De investigación fundamental (incluyendo excavaciones arqueológicas, etc.). **Ámbito geográfico:** Internacional no UE

Grado de contribución: Coordinador del proyecto total, red o consorcio



Entidad de realización: Institute for Astronomy of the University of Hawaii
Tipo de entidad: Centros de Innovación y Tecnología
Ciudad entidad realización: Honolulu, Estados Unidos de América
Nombres investigadores principales (IP, Co-IP,...): Eduardo Martín
Nº de investigadores/as: 6
Nº de personas/año: 5
Entidad/es financiadora/s: National Science Foundation
Tipo de entidad: Agencia Estatal
Ciudad entidad financiadora: Washington DC, Estados Unidos de América
Tipo de participación: Coordinador
Fecha de inicio-fin: 01/11/2001 - 30/06/2006
Duración: 4 años - 7 meses
Cuantía total: 234.239 €
Resultados relevantes: Descubrimiento y caracterización de objetos de masa subestelar y determinación de algunas de sus propiedades estadísticas
Régimen de dedicación: Tiempo completo
Aportación del solicitante: Coordinador

- 11 Nombre del proyecto:** Desarrollo del diseño conceptual del espectrógrafo NAHUAL
Modalidad de proyecto: De demostración, proyectos piloto, de formulación conceptual y diseño de productos y de procesos o servicios
Ámbito geográfico: Nacional
Grado de contribución: Coordinador del proyecto total, red o consorcio
Entidad de realización: Instituto de Astrofísica de Canarias
Tipo de entidad: Organismo Público de Investigación
Ciudad entidad realización: San Cristóbal de La Laguna, Canarias, España
Nombres investigadores principales (IP, Co-IP,...): Eduardo Martín
Nº de investigadores/as: 5
Nº de personas/año: 5
Entidad/es financiadora/s: Ministerio de Ciencia e Innovación. Investigación
Tipo de entidad: FEDER
Tipo de participación: Investigador principal
Cód. según financiadora: AYA2004-22113-E
Fecha de inicio-fin: 01/03/2005 - 28/02/2006
Duración: 1 año
Cuantía total: 25.000 €
Cuantía subproyecto: 25.000 €
Régimen de dedicación: Tiempo completo

Actividades científicas y tecnológicas

Producción científica

Publicaciones, documentos científicos y técnicos

- 1 Enrique Solano Márquez; Mari Cruz Gálvez; Eduardo Martín; Inés Gómez Muñoz; Carlos Rodrigo; Adam Burgasser; Nicolas Lodieu; Víctor Sánchez Béjar; Nuria Huelamo; Maria Morales Calderon; Hervé Bouy. Ultracool dwarfs in deep extragalactic surveys using the virtual observatory: ALHAMBRA and COSMOS. Monthly Notices of the Royal Astronomical Society. 501 - 1, pp. 281 - 290. Oxford academic journals, 01/01/2021.

Tipo de producción: Artículo científico

Posición de firma: 3

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: No

Nº total de autores: 11

Resultados relevantes: We aim to validate a VO methodology designed to discover and characterize UCDs in deep extragalactic surveys like Advance Large Homogeneous Area Medium-Band Redshift Astronomical (ALHAMBRA) and Cosmological Evolution Survey (COSMOS). Three complimentary searches based on parallaxes, proper motions and colours, respectively, were carried out. A total of 897 candidate UCDs were found, with only 16 previously reported in SIMBAD. Most of the new UCDs reported here are likely late-M and L dwarfs because of the limitations imposed by the utilization of optical (Gaia DR2 and r-band) data. We complement ALHAMBRA and COSMOS photometry with other catalogues in the optical and infrared using VOSA, a VO tool that estimates effective temperatures from the spectral energy distribution fitting to collections of theoretical models. The agreement between the number of UCDs found in the COSMOS field and theoretical estimations together with the low false-negative rate (known UCDs not discovered in our search) validates the methodology proposed in this work, which will be used in the forthcoming wide and deep surveys provided by the Euclid space mission. Simulations of Euclid number counts for UCDs detectable in different photometric passbands are presented for a wide survey area of 15 000 deg², and the limitations of applicability of Euclid data to detect UCDs using the methods employed in this paper are discussed.

Publicación relevante: Si

- 2 Eduardo Martín; Nicolas Lodieu; Víctor Sánchez Béjar. Search for the sub-stellar lithium depletion boundary in the open star cluster Coma Berenices. Astronomy & Astrophysics. 640 - 1, pp. A9 - 19. edp sciences, 01/08/2020.

Tipo de producción: Artículo científico

Posición de firma: 1

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: Si

Nº total de autores: 3

Resultados relevantes: We carried out a search for additional candidates photometrically using colour-magnitude diagrams combining optical and infrared photometry from the latest public releases of the following large-scale surveys: the United Kingdom InfraRed Telescope Infrared Deep Sky Survey (UKIRT/UKIDSS), the Panoramic Survey Telescope and Rapid Response System (Pan-STARRS), the Sloan Digital Sky Survey (SDSS), and AllWISE. We checked astrometric consistency with cluster membership using Gaia DR2. A search for Li in three new and five previously known brown dwarf candidate cluster members was performed via spectroscopic observations using the OSIRIS instrument at the 10.4 m Gran Telescopio de Canarias (GTC). Results: A couple dozen new photometric candidate brown dwarfs located inside the tidal radius of Coma Ber are reported, but none of these are significantly fainter and cooler than previously known members. No Li resonance doublet at 6707.8 Å was detected in any of eight Coma Ber targets in the magnitude range J = 15-19 and G = 20-23 observed with the GTC. Spectral types and radial velocities were derived from the GTC spectra. These values confirm the cluster membership of four L2-L2.5 dwarfs, two of which are new in the literature. Conclusions: The large Li depletion factors found among the four bona fide sub-stellar members in Coma Ber implies that the LDB must be located at spectral type later than L2.5 in this cluster. Using the latest evolutionary models for brown dwarfs, a lower limit of 550 Myr on the cluster age is set. This constraint has been combined with other dating methods to obtain



an updated age estimate of 780 ± 230 Myr for the Coma Ber open cluster. Identification of significantly cooler sub-stellar cluster members in Coma Ber awaits the advent of the Euclid wide survey, which should reach a depth of about $J = 23$; this superb sensitivity will make it possible to determine the precise location of the sub-stellar LDB in this cluster and to carry out a complete census of its sub-stellar population.

Publicación relevante: Si

- 3** Juan Carlos Morales; A. Mustill; Ignasi Ribas; CARMENES consortium. A giant exoplanet orbiting a very-low-mass star challenges planet formation models. *Science*. 365 - 6460, pp. 1441 - 1445. 03/09/2019.

Tipo de producción: Artículo científico

Posición de firma: 128

Nº total de autores: 182

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: No

Citas: 28

Resultados relevantes: Surveys have shown that super-Earth and Neptune-mass exoplanets are more frequent than gas giants around low-mass stars, as predicted by the core accretion theory of planet formation. We report the discovery of a giant planet around the very-low-mass star GJ 3512, as determined by optical and near-infrared radial-velocity observations. The planet has a minimum mass of 0.46 Jupiter masses, very high for such a small host star, and an eccentric 204-day orbit. Dynamical models show that the high eccentricity is most likely due to planet-planet interactions. We use simulations to demonstrate that the GJ 3512 planetary system challenges generally accepted formation theories, and that it puts constraints on the planet accretion and migration rates. Disk instabilities may be more efficient in forming planets than previously thought.

Publicación relevante: Si

- 4** Enrique Solano; Eduardo Martín; Jose Antonio Caballero; Carlos Rodrigo; Ramon Angulo. J-PLUS: Discovery and characterisation of ultracool dwarfs using Virtual Observatory tools}. *Astronomy & Astrophysics*. 627 - 1, pp. A29 - 38. edp sciences, 01/07/2019.

Tipo de producción: Artículo científico

Posición de firma: 2

Nº total de autores: 26

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: No

Citas: 2

Resultados relevantes: We aim to validate a Virtual Observatory methodology designed to discover and characterise ultracool dwarfs in the J-PLUS photometric survey. J-PLUS is a multiband survey carried out with the wide-angle T80Cam optical camera mounted on the 0.83 m telescope JAST/T80 in the Observatorio Astrofísico de Javalambre. We make use of the Internal Data Release covering 528 deg². Methods: We complemented J-PLUS photometry with other catalogues in the optical and infrared using VOSA, a Virtual Observatory tool that estimates physical parameters from the spectral energy distribution fitting to collections of theoretical models. Objects identified as ultracool dwarfs were distinguished from background M giants and highly reddened stars using parallaxes and proper motions from Gaia DR2. Results: We identify 559 ultracool dwarfs, ranging from $i = 16.2$ mag to $i = 22.4$ mag, of which 187 are candidate ultracool dwarfs not previously reported in the literature. This represents an increase in the number of known ultracool dwarfs of about 50% in the region of the sky we studied, particularly at the faint end of our sensitivity, which is interesting as reference for future wide and deep surveys such as Euclid. Three candidates are interesting targets for exoplanet surveys because of their proximity (distances less than 40 pc). We also analysed the kinematics of ultracool dwarfs in our catalogue and found evidence that it is consistent with a Galactic thin-disc population, except for six objects that might be members of the thick disc. Conclusion. The results we obtained validate the proposed methodology, which will be used in future J-PLUS and J-PAS releases. Considering the region of the sky covered by the Internal Data Release used in this work, we estimate that 3000-3500 new ultracool dwarfs will be discovered at the end of the J-PLUS project.

Publicación relevante: Si

- 5** Matias Zechmeister; Stephan Dreizler; Ignasi Ribas; CARMENES consortium. The CARMENES search for exoplanets around M dwarfs. Two temperate Earth-mass planet candidates around Teegarden's Star. *Astronomy & Astrophysics*. 627, pp. A49 - 14 p.. EDP sciences, 01/07/2019.

Tipo de producción: Artículo científico

Tipo de soporte: Revista

Posición de firma: 127**Nº total de autores:** 183**Fuente de citas:** ADS**Grado de contribución:** Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo**Autor de correspondencia:** No**Citas:** 39

Resultados relevantes: Teegarden's Star is the brightest and one of the nearest ultra-cool dwarfs in the solar neighbourhood. For its late spectral type (M7.0 V), the star shows relatively little activity and is a prime target for near-infrared radial velocity surveys such as CARMENES. Aims: As part of the CARMENES search for exoplanets around M dwarfs, we obtained more than 200 radial-velocity measurements of Teegarden's Star and analysed them for planetary signals. Methods: We find periodic variability in the radial velocities of Teegarden's Star. We also studied photometric measurements to rule out stellar brightness variations mimicking planetary signals. Results: We find evidence for two planet candidates, each with 1.1 M_{\oplus} minimum mass, orbiting at periods of 4.91 and 11.4 d, respectively. No evidence for planetary transits could be found in archival and follow-up photometry. Small photometric variability is suggestive of slow rotation and old age. Conclusions: The two planets are among the lowest-mass planets discovered so far, and they are the first Earth-mass planets around an ultra-cool dwarf for which the masses have been determined using radial velocities.

Publicación relevante: Si

- 6 Denis Shulyak; Ansgar Reiners; E. Nagel; Lev Tal-Or; Jose Antonio Caballero; Mattias Zechmaster; Víctor Sánchez Béjar; Maria Cortés Contreras; Eduardo Martín; Ignasi Ribas; Andreas Quirrenbach; Pedro Amado; Gillem Anglada Escudé; Stephan Dreizler; Eike Guenther; Thomas Henning; Sandra Jeffers; Martin Kurster; David Montes; Juan Carlos Morales. Magnetic fields in M dwarfs from the CARMENES survey. *Astronomy & Astrophysics*. 626, pp. A86 - 24 p.. EDP sciences, 29/06/2019.

Tipo de producción: Artículo científico**Tipo de soporte:** Revista**Posición de firma:** 9**Nº total de autores:** 24**Fuente de citas:** ADS**Autor de correspondencia:** No**Citas:** 18

Resultados relevantes: M dwarfs are known to generate the strongest magnetic fields among main-sequence stars with convective envelopes, but we are still lacking a consistent picture of the link between the magnetic fields and underlying dynamo mechanisms, rotation, and activity. Aims: In this work we aim to measure magnetic fields from the high-resolution near-infrared spectra taken with the CARMENES radial-velocity planet survey in a sample of 29 active M dwarfs and compare our results against stellar parameters. Methods: We used the state-of-the-art radiative transfer code to measure total magnetic flux densities from the Zeeman broadening of spectral lines and filling factors. Results: We detect strong kG magnetic fields in all our targets. In 16 stars the magnetic fields were measured for the first time. Our measurements are consistent with the magnetic field saturation in stars with rotation periods $P < 4$ d. The analysis of the magnetic filling factors reveal two different patterns of either very smooth distribution or a more patchy one, which can be connected to the dynamo state of the stars and/or stellar mass. Conclusions: Our measurements extend the list of M dwarfs with strong surface magnetic fields. They also allow us to better constrain the interplay between the magnetic energy, stellar rotation, and underlying dynamo action. The high spectral resolution and observations at near-infrared wavelengths are the beneficial capabilities of the CARMENES instrument that allow us to address important questions about the stellar magnetism.

Publicación relevante: Si

- 7 Ansgar Reiners; Matias Zechmeister; Jose Antonio Caballero; CARMENES consortium. The CARMENES search for exoplanets around M dwarfs. High-resolution optical and near-infrared spectroscopy of 324 survey stars. *Astronomy & Astrophysics*. 612, pp. A49 - 63 p.. EDP sciences, 04/04/2018.

Tipo de producción: Artículo científico**Tipo de soporte:** Revista**Posición de firma:** 102**Grado de contribución:** Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo**Nº total de autores:** 171**Fuente de citas:** ADS**Autor de correspondencia:** No**Citas:** 90

Resultados relevantes: The CARMENES radial velocity (RV) survey is observing 324 M dwarfs to search for any orbiting planets. In this paper, we present the survey sample by publishing one CARMENES spectrum for each M dwarf. These spectra cover the wavelength range 520-1710 nm at a resolution of at least $R > 80\,000$, and we measure its RV, H α emission, and projected rotation velocity. We present an atlas of high-resolution M-dwarf

spectra and compare the spectra to atmospheric models. To quantify the RV precision that can be achieved in low-mass stars over the CARMENES wavelength range, we analyze our empirical information on the RV precision from more than 6500 observations. We compare our high-resolution M-dwarf spectra to atmospheric models where we determine the spectroscopic RV information content, Q , and signal-to-noise ratio. We find that for all M-type dwarfs, the highest RV precision can be reached in the wavelength range 700-900 nm. Observations at longer wavelengths are equally precise only at the very latest spectral types (M8 and M9). We demonstrate that in this spectroscopic range, the large amount of absorption features compensates for the intrinsic faintness of an M7 star. To reach an RV precision of 1 m s⁻¹ in very low mass M dwarfs at longer wavelengths likely requires the use of a 10 m class telescope. For spectral types M6 and earlier, the combination of a red visual and a near-infrared spectrograph is ideal to search for low-mass planets and to distinguish between planets and stellar variability. At a 4 m class telescope, an instrument like CARMENES has the potential to push the RV precision well below the typical jitter level of 3-4 m s⁻¹.

Publicación relevante: Si

- 8** Eduardo Martín; Nicolas Lodieu; Yakiv Pavlenko; Víctor Sánchez Béjar. The Lithium Depletion Boundary and the Age of the Hyades Cluster. *The Astrophysical Journal*. 856 - 1, pp. 40 - 48. IOPscience, 01/03/2018.

Tipo de producción: Artículo científico

Posición de firma: 1

Nº total de autores: 4

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: Si

Citas: 39

Resultados relevantes: Determination of the lithium depletion boundary (LDB), i.e., the observational limit below which the cores of very low-mass objects do not reach high enough temperatures for Li destruction, has been used to obtain ages for several open clusters and stellar associations younger than 200 Myr—which until now has been considered the practical upper limit on the range of applicability of this method. In this work, we show that the LDB method can be extended to significant older ages than previously thought. Intermediate resolution optical spectra of six L-type candidate members in the Hyades cluster obtained using Optical System for Imaging and Low Resolution Integrated Spectroscopy at the 10.4 m Gran Telescopio Canarias are presented. The {Li} {I} 670.8 nm resonance doublet is clearly detected only in the two faintest and coolest of these objects, which are classified as L3.5 to L4 brown dwarf (BD) cluster members with luminosities around 10-4 solar. Lithium depletion factors are estimated for our targets with the aid of synthetic spectra and they are compared with predictions from evolutionary models. An LDB age of 650 ± 70 Myr for the Hyades provides a consistent description of our data using a set of state-of-the-art evolutionary models for BDs calculated by Baraffe et al.

Publicación relevante: Si

- 9** Giacomo Beccari; Monika Petr Gotzens; Henri Boffin; M. Romaniello; D. Fedele; Giuseppe Carraro; Guido de Marchi; Wilhem de Wit; Janet Drew; Vera Kalari; C. Manara; Eduardo Martín; S. Mieski; Nino Panagia; L. Testi; J. Wink; J. Walsh; N. Wright. A tale of three cities. *OmegaCAM discovers multiple sequences in the color-magnitude diagram of the Orion Nebula Cluster*. *Astronomy & Astrophysics*. 604, pp. A22 - 8 páginas. EDP sciences, 01/07/2017.

Tipo de producción: Artículo científico

Posición de firma: 12

Nº total de autores: 18

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: No

Citas: 42

Resultados relevantes: As part of the accretion discs in H α with OmegaCAM (ADHOC) survey, we imaged a region of 12×8 square degrees around the Orion Nebula Cluster in r, I and H α . Thanks to the high-quality photometry obtained, we discovered three well-separated pre-main sequences in the color-magnitude diagram. The populations are all concentrated towards the cluster's center. Although several explanations can be invoked to explain these sequences, we are left with two competitive but intriguing scenarios: a population of unresolved binaries with an exotic mass ratio distribution, or three populations with different ages. Independent high-resolution spectroscopy supports the presence of discrete episodes of star formation, each separated by about a million years. The stars from the two putative youngest populations rotate faster than the older ones, in agreement with the evolution of stellar rotation observed in pre-main sequence stars younger than 4 Myr in several star

forming regions. Whatever the final explanation, our results prompt a revised look at the formation mode and early evolution of stars in clusters.

Publicación relevante: Si

- 10** Veda Kalari; Joel Vink; Janet Drew; Gert Barentsen; Jeremy Drake; Joachim Eisloffel; Eduardo Martín; Quentin Parker; Yvonne Unruh; Nick Walton; Nick Wright. Classical T Tauri stars with VPHAS+ - I. H α and u-band accretion rates in the Lagoon Nebula M8. Monthly Notices of the Royal Astronomical Society. 453, pp. 1026 - 1046. Oxford, 01/10/2015.

Tipo de producción: Artículo científico

Posición de firma: 7

Nº total de autores: 11

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: No

Citas: 21

Resultados relevantes: We estimate the accretion rates of 235 Classical T Tauri star (CTTS) candidates in the Lagoon Nebula using ugr_i H α photometry from the VST Photometric H α survey+. Our sample consists of stars displaying H α excess, the intensity of which is used to derive accretion rates. For a subset of 87 stars, the intensity of the u-band excess is also used to estimate accretion rates. We find the mean variation in accretion rates measured using H α and u-band intensities to be ~ 0.17 dex, agreeing with previous estimates (0.04–0.4 dex) but for a much larger sample. The spatial distribution of CTTS align with the location of protostars and molecular gas suggesting that they retain an imprint of the natal gas fragmentation process. Strong accretors are concentrated spatially, while weak accretors are more distributed. Our results do not support the sequential star-forming processes suggested in the literature.

Publicación relevante: Si

- 11** Miriam Aberasturi; Adam Burgasser; Alfredo Mora; Enrique Solano; Eduardo Martín; Neil Reid; Dan Looper. Constraints on the Binary Properties of Mid- to Late T Dwarfs from Hubble Space Telescope WFC3 Observations. The Astronomical Journal. 148 - 6, pp. 129 - 149. IOP sciences, 01/12/2014.

Tipo de producción: Artículo científico

Posición de firma: 5

Nº total de autores: 7

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: No

Citas: 15

Resultados relevantes: We used Hubble Space Telescope/Wide Field Camera 3 (WFC3) observations of a sample of 26 nearby (≤ 20 pc) mid- to late T dwarfs to search for cooler companions and measure the multiplicity statistics of brown dwarfs (BDs). Tightly separated companions were searched for using a double point-spread-function-fitting algorithm. We also compared our detection limits based on simulations to other prior T5+ BD binary programs. No new wide or tight companions were identified, which is consistent with the number of known T5+ binary systems and the resolution limits of WFC3. We use our results to add new constraints to the binary fraction (BF) of T-type BDs. Modeling selection effects and adopting previously derived separation and mass ratio distributions, we find an upper limit total BF of $< 16\%$ and $< 25\%$ assuming power law and flat mass ratio distributions, respectively, which are consistent with previous results. We also characterize a handful of targets around the L/T transition.

Publicación relevante: Si

- 12** Maria Rosa Zapatero Osorio; Víctor Sánchez Béjar; Eduardo Martín; Mari Cruz Gálvez Ortiz; Rafael Rebolo; Gabriel Bihain; Thomas Henning; Steve Boudreault; Bertrand Goldman; Reinhold Mundt; Jose Antonio Caballero; Paulo Miles Páez. Spectroscopic follow-up of L- and T-type proper-motion member candidates in the Pleiades. Astronomy & Astrophysics. 572 - 1, pp. A67 - 73. edp sciences, 01/12/2014.

Tipo de producción: Artículo científico

Posición de firma: 3

Nº total de autores: 12

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: No

Citas: 14

Resultados relevantes: We report on the near-infrared (JHK-bands) low-resolution spectroscopy and red optical (Z-band) photometry of seven proper-motion, very low-mass substellar member candidates of the Pleiades cluster with magnitudes in the interval $J = 17.5\text{-}20.8$ and $K = 16.1\text{-}18.5$ mag. Spectra were acquired for six objects with the LIRIS and NIRSPEC instruments mounted on the 4.2-m William Herschel and the 10-m Keck II telescopes, respectively. Z-band images of two of the faintest candidates were collected with the ACAM instrument on the WHT. The new data confirm the low temperatures of all seven Pleiades proper motion candidates. From the imaging observations, we find extremely red Z - J and Z - K colors that suggest that the faintest target, Calar Pleiades 25, has a Galactic rather than extragalactic nature. We tentatively classify the spectroscopic targets from early-L to $\sim T_0$ and suggest that the L/T transition, which accounts for the onset of methane absorption at $2.1\ \mu\text{m}$, may take place at $J \approx 20.3$ and $K \approx 17.8$ mag in the Pleiades (absolute values of $M_J \approx 14.7$ and $M_K \approx 12.2$ mag). We find evidence of likely low-gravity atmospheres based on the presence of triangular-shape H-band fluxes and the high flux ratio K/H (compatible with red H - K colors) of Calar Pleiades 20, 21, and 22, which is a feature also seen in field low-gravity dwarfs. Weak K i absorption lines at around $1.25\ \mu\text{m}$ are probably seen in two targets. These observations add support to the cluster membership of all seven objects in the Pleiades. The trend delineated by the spectroscopic sequence of Pleiades late-M and L dwarfs resembles that of the field. With masses estimated at $0.012\text{-}0.015 M_{\odot}$ (solar metallicity and 120 Myr), Calar Pleiades 20 ($L_{6\pm 1}$), 21 ($L_{7\pm 1}$), and 22 (L/T) may become the coolest and least massive Pleiades members that are corroborated with photometry, astrometry, and spectroscopy. Calar Pleiades 25 ($<0.012 M_{\odot}$) is a firm free-floating planetary-mass candidate in the Pleiades.

Publicación relevante: Si

- 13** Johannes Shalman; Peter Lazorenko; Damien Ségransan; Eduardo Martín; Michel Mayor; Didier Queloz; Stephane Udry. Astrometric planet search around southern ultracool dwarfs. I. First results, including parallaxes of 20 M8-L2 dwarfs. *Astronomy & Astrophysics*. 565 - 1, pp. A20 - 39. edp sciences, 01/05/2014.

Tipo de producción: Artículo científico

Posición de firma: 3

Nº total de autores: 7

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: No

Citas: 35

Resultados relevantes: We present first results of an astrometric search for planets around 20 nearby dwarf stars with spectral types M8-L2. **Methods:** Over a time-span of two years, we obtained I-band images of the target fields with the FORS2 camera at the Very Large Telescope. Using background stars as references, we monitored the targets' astrometric trajectories, which allowed us to measure parallax and proper motions, set limits on the presence of planets, and to discover the orbital motions of two binary systems. **Results:** We determined trigonometric parallaxes with an average accuracy of $0.09\ \text{mas}$ ($\approx 0.2\%$), which resulted in a reference sample for the study of ultracool dwarfs at the M/L transition, whose members are located at distances of 9.5-40 pc. This sample contains two newly discovered tight binaries (DE0630-18 and DE0823-49) and one previously known wide binary (DE1520-44). Only one target shows I-band variability $>5\ \text{mmag rms}$. We derived planet exclusion limits that set an upper limit of 9% on the occurrence of giant planets with masses $\geq 5\ \text{MJ}$ in intermediate-separation (0.01-0.8 AU) orbits around M8-L2 dwarfs. **Conclusions:** We demonstrate that astrometric observations with an accuracy of $120\ \mu\text{as}$ over two years are feasible from the ground and can be used for a planet-search survey. The detection of two tight very low-mass binaries shows that our search strategy is efficient and may lead to the detection of planetary-mass companions through follow-up observations.

Publicación relevante: Si

- 14** Eduardo Martín; Phan Bao Ngoc; Mike Bessell; Xavier Delfosse; Thierry Forveille; Antonio Magazzù; Celine Reylé; Hervé Bouy; Ramarao Tata. Spectroscopic characterization of 78 DENIS ultracool dwarf candidates in the solar neighborhood and the Upper Scorpii OB association. *Astronomy and Astrophysics*. 517 - 1, pp. A53 - 69. EDP sciences, 01/07/2010.

Tipo de producción: Artículo científico

Posición de firma: 1

Nº total de autores: 9

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: Si

Citas: 53

Resultados relevantes: We search for new ultracool dwarfs and report here our observations of 78 ultracool dwarf candidates that have been photometrically selected using the DENIS survey point source catalogue. We analyze low-resolution optical spectroscopic observations to estimate spectral types of all candidates. Methods: We derive spectral types for each object using measurements of the PC3 spectral index as defined in Martín et al. They range from M6 to L3. The H α emission and NaI subordinate doublet (818.3 nm and 819.9 nm) equivalent widths are measured in the spectra to identify young stellar objects. Spectroscopic indices of TiO, VO, CrH, and FeH molecular features are also reported. Results: A rule-of-thumb criterion for selecting young very low-mass objects using the NaI doublet equivalent width is given. It is used to confirm seven new members of the Upper Sco OB association and two new members of the R Cr-A star-forming region. Four of our field objects are also classified as very young, but are not members of any known nearby young association. The frequency of lower-gravity young objects in our field ultracool sample is 8.5%. Our results provide the first spectroscopic classification for 42 ultracool dwarfs in the solar vicinity with spectrophotometric distances in the range 17 pc to 65 pc (3 of them being new L dwarfs within 20 pc).

Publicación relevante: Si

- 15** Eduardo Martín; Eike Guenther; Maria Rosa Zapatero Osorio; Hervé Bouy; Richard Wainscoat. A Multiwavelength Radial Velocity Search for Planets around the Brown Dwarf LP 944-20. The Astrophysical Journal. 644 - 1, pp. L75 - L78. IOP science, 01/06/2006.

Tipo de producción: Artículo científico

Posición de firma: 1

Nº total de autores: 5

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: Si

Citas: 55

Resultados relevantes: The nearby brown dwarf LP 944-20 has been monitored for radial velocity variability at optical and near-infrared wavelengths using the VLT/UVES and the Keck/NIRSPEC, respectively. The UVES radial velocity data obtained over 14 nights spanning a baseline of 841 days show significant variability with an amplitude of 3.5 km s⁻¹. The periodogram analysis of the UVES data indicates a possible period between 2.5 and 3.7 hr, which is likely due to the rotation of the brown dwarf. However, the NIRSPEC data obtained over 6 nights show an rms dispersion of only 0.36 km s⁻¹ and do not follow the periodic trend. These results indicate that the variability seen with UVES is likely to be due to rotationally modulated inhomogeneous surface features. We suggest that future planet searches around very low mass stars and brown dwarfs using radial velocities will be better conducted in the near-infrared than in the optical.

Publicación relevante: Si

- 16** Eduardo Martín; Xavier Delfosse; Sylvain Guieu. Spectroscopic Identification of DENIS-selected Brown Dwarf Candidates in the Upper Scorpius OB Association. The Astronomical Journal. 127 - 1, pp. 449 - 454. IOP Sciences, 15/01/2004.

Tipo de producción: Artículo científico

Posición de firma: 1

Nº total de autores: 3

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: Si

Citas: 79

Resultados relevantes: We present low-resolution (R=900) optical (576.1-1051.1 nm) spectroscopic observations of 40 candidate very low mass members in the Upper Scorpius OB association. These objects were selected using the I, J, and K photometry available in the Deep Near-Infrared Survey (DENIS) database. We have derived spectral types, and we have measured H α and Na I doublet (at 818.3 and 819.5 nm) equivalent widths. We assess the youth of the objects by comparing them with their older counterparts of similar spectral type in the Pleiades cluster and the field. Our analysis indicates that 28 of our targets are young very low mass objects, and thus they are strong candidate members of the OB association. The other 12 DENIS sources are foreground M dwarfs or background red giants. Our sample of spectroscopic candidate members includes 18 objects with spectral types in the range M6.5-M9, which are likely young brown dwarfs. We classify these candidates as accreting/nonaccreting using the scheme proposed by Barrado y Navascués & Martín. We find five substellar-mass candidate cluster members that are still undergoing mass accretion, indicating that the timescale for accretion onto brown dwarfs can be as long as 5 Myr in some cases.



Publicación relevante: Si

- 17** Hervé Bouy; Wolfgang Brandner; Eduardo Martín; Xavier Delfosse; France Allard; Gibor Basri. Multiplicity of Nearby Free-Floating Ultracool Dwarfs: A Hubble Space Telescope WFC2 Search for Companions. The Astronomical Journal. 126, pp. 1526 - 1554. IOP sciences, 01/09/2003.

Tipo de producción: Artículo científico

Posición de firma: 3

Nº total de autores: 6

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: No

Citas: 257

Resultados relevantes: We present Hubble Space Telescope (HST) Wide Field Planetary Camera 2 (WFC2) observations of a sample of 134 ultracool objects (spectral types later than M7) coming from the Deep Near Infrared Survey (DENIS), Two Micron All Sky Survey (2MASS), and Sloan Digital Sky Survey (SDSS), with distances estimated to range from 7 to 105 pc. Fifteen new ultracool binary candidates are reported here. Eleven known binaries are confirmed, and orbital motion is detected in some of them. We estimate that the closest binary systems in this sample have periods between 5 and 20 yr, and thus dynamical masses will be derived in the near future. For the calculation of binary frequency, we restrict ourselves to systems with distances less than 20 pc. After correction of the binaries bias, we find a ratio of visual binaries (at the HST limit of detection) of around 10%, and that ~15% of the 26 objects within 20 pc are binary systems with separations between 1 and 8 AU. The observed frequency of ultracool binaries is similar to that of binaries with G-type primaries in the separation range from 2.1 to 140 AU. There is also a clear deficit of ultracool binaries with separations greater than 15 AU, and a possible tendency for the binaries to have mass ratios near unity. Most systems have indeed visual and near-infrared brightness ratios between 1 and 0.3. We discuss our results in the framework of current scenarios for the formation and evolution of free-floating brown dwarfs.

Publicación relevante: Si

- 18** Dan Potter; Eduardo Martín; Mike Cushing; Pierre Baudoz; Wolfgang Brandner; Olivier Guyon; Ralph Neuhauser. Hokupa'a-Gemini Discovery of Two Ultracool Companions to the Young Star HD 130948. The Astrophysical Journal. 567 - 2, pp. L133 - L136. IOP sciences, 01/03/2002.

Tipo de producción: Artículo científico

Posición de firma: 2

Nº total de autores: 7

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: No

Citas: 110

Resultados relevantes: We report the discovery of two faint ultracool companions to the nearby ($d \sim 17.9$ pc) young G2 V star HD 130948 (HR 5534, HIP 72567) using the Hokupa'a adaptive optics (AO) instrument mounted on the Gemini North 8 m telescope. Both objects have the same common proper motion as the primary star as seen over a 7 month baseline and have near-IR photometric colors that are consistent with an early L classification. Near-IR spectra taken with the NIRSPEC AO instrument on the Keck II telescope reveal K I lines, FeH, and H₂O band heads. Based on these spectra, we determine that both objects have a spectral type of dL2 with an uncertainty of two spectral subclasses. The position of the new companions on the H-R diagram in comparison with theoretical models is consistent with the young age of the primary star (< 0.8 Gyr) estimated on the basis of X-ray activity, lithium abundance, and fast rotation. HD 130948B and C likely constitute a pair of young contracting brown dwarfs with an orbital period of about 10 yr and will yield dynamical masses for L dwarfs in the near future.

Publicación relevante: Si

- 19** Eduardo Martín; Catherine Dougados; Eugene Magnier; Francois Ménard; Antonio Magazzù; Jean Claude Cuillandre; Xavier Delfosse. Four Brown Dwarfs in the Taurus Star-Forming Region. The Astrophysical Journal. 561 - 2, pp. L195 - L198. 01/11/2001.

Tipo de producción: Artículo científico

Posición de firma: 1

Nº total de autores: 7

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: Si

Fuente de citas: ADS

Citas: 97

Resultados relevantes: We have identified four brown dwarfs in the Taurus star-forming region. They were first selected from R and I CCD photometry of 2.29 deg² obtained at the Canada-France-Hawaii Telescope. Subsequently, they were recovered in the Two Micron All Sky Survey second incremental data release point source catalog. Low-resolution optical spectra obtained at the William Herschel Telescope allow us to derive spectral types in the range M7-M9. One of the brown dwarfs has very strong H α emission (EW=-340 Å). It also displays Br γ emission in an infrared spectrum obtained with the Infrared Camera and Spectrograph on the Subaru telescope, suggesting that it is accreting matter from a disk. The K I resonance doublet and the Na I subordinate doublet at 818.3 and 819.5 nm in these Taurus objects are weaker than in field dwarfs of similar spectral type, consistent with low surface gravities as expected for young brown dwarfs. Two of the objects are cooler and fainter than GG Tau Bb, the lowest mass known member of the Taurus association. We estimate masses of only 0.03 Msolar for them. The spatial distribution of brown dwarfs in Taurus hints at a possible anticorrelation between the density of stars and the density of brown dwarfs.

Publicación relevante: Si

- 20 Eduardo Martín; Wolfgang Brandner; Jerome Bouvier; Kevin Luhman; John Stauffer; Gibor Basri; Maria Rosa Zapatero Osorio; David Barrado Navascués. Membership and Multiplicity among Very Low Mass Stars and Brown Dwarfs in the Pleiades Cluster. *The Astrophysical Journal*. 543 - 1, pp. 299 - 312. IOP sciences, 10/11/2000.

Tipo de producción: Artículo científico

Tipo de soporte: Revista

Posición de firma: 1

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Nº total de autores: 8

Autor de correspondencia: Si

Fuente de citas: ADS

Citas: 128

Resultados relevantes: We present near-infrared photometry and optical spectroscopy of very low mass stars and brown dwarf candidates in the Pleiades open cluster. The membership status of these objects is assessed using color-magnitude diagrams, lithium and spectral types. Eight objects out of 45 appear to be nonmembers. A search for companions among 34 very low mass Pleiades members ($M \leq 0.09$ Msolar) in high spatial resolution images obtained with the Hubble Space Telescope (HST) and the adaptive optics system of the Canada-France-Hawaii telescope produced no resolved binaries with separations larger than 0.2" ($a \sim 27$ AU $P \sim 444$ yr). Nevertheless, we find evidence for a binary sequence in the color-magnitude diagrams, in agreement with the results of Steele & Jameson for higher mass stars. We apply the lithium test to two objects: CFHT-PI-16, which lies in the cluster binary sequence but is unresolved in images obtained with the Hubble Space Telescope; and CFHT-PI-18, which is binary with 0.33" separation. The first object passes the test, but the second object does not. We conclude that CFHT-PI-16 is an Pleiades brown dwarf binary with separation less than 11 AU and that CFHT-PI-18 is a foreground system. We compare the multiplicity statistics of the Pleiades very low mass stars and brown dwarfs with that of G- and K-type main-sequence stars in the solar neighborhood. We find that there is some evidence for a deficiency of wide binary systems (separation > 27 AU) among the Pleiades very low mass members. We briefly discuss how this result can fit with current scenarios of brown dwarf formation. We correct the Pleiades substellar mass function for the contamination of cluster nonmembers found in this work. We find a contamination level of 33% among the brown dwarf candidates identified by Bouvier et al. Assuming a power-law IMF across the substellar boundary, we find a slope $dN/dM \sim M^{-0.53}$, implying that the number of objects per mass bin is still rising but the contribution to the total mass of the cluster is declining in the brown dwarf regime. Based in part on observations made with the NASA/ESA Hubble Space Telescope, obtained at the Space Telescope Science Institute, which is operated by the Association of Universities for Research in Astronomy, Inc., under NASA contract NAS 5-26555.

Publicación relevante: Si

- 21 Maria Rosa Zapatero Osorio; Víctor Sánchez Béjar; Eduardo Martín; Rafael Rebolo; David Barrado Navascués; Colin Bailer-Jones; Reinhard Mundt. Discovery of Young, Isolated Planetary Mass Objects in the σ Orionis Star Cluster. *Science*. 290 - 5489, pp. 103 - 107. American Association for the Advancement of Science, 02/10/2000.

Tipo de producción: Artículo científico

Tipo de soporte: Revista

Posición de firma: 3

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Nº total de autores: 7

Autor de correspondencia: No

Fuente de citas: ADS

Citas: 266

Resultados relevantes: We present the discovery by optical and near-infrared imaging of an extremely red, low-luminosity population of isolated objects in the young, nearby stellar cluster around the multiple, massive star σ Orionis. The proximity (352 parsecs), youth (1 million to 5 million years), and low internal extinction make this cluster an ideal site to explore the substellar domain from the hydrogen mass limit down to a few Jupiter masses. Optical and near-infrared low-resolution spectroscopy of three of these objects confirms the very cool spectral energy distribution (atmospheric effective temperatures of 1700 to 2200 kelvin) expected for cluster members with masses in the range 5 to 15 times that of Jupiter. Like the planets of the solar system, these objects are unable to sustain stable nuclear burning in their interiors, but in contrast they are not bound to stars. This new kind of isolated giant planet, which apparently forms on time scales of less than a few million years, offers a challenge to our understanding of the formation processes of planetary mass objects.

Publicación relevante: Si

- 22** Eduardo Martín; Xavier Delfosse; Gibor Basri; Bertrand Goldman; Thierry Forveille. Spectroscopic Classification of Late-M and L Field Dwarfs. *The Astronomical Journal*. 118 - 5, pp. 2466 - 2482. IOP sciences, 02/11/1999.

Tipo de producción: Artículo científico

Posición de firma: 1

Nº total de autores: 6

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: Si

Citas: 384

Resultados relevantes: We present spectra for 12 new ultracool dwarfs found in the DENIS infrared survey. Seven of them have spectral types at the bottom of the M-class (M8-M9.5), and the other five belong to the cooler "L" class. We also present spectra for the two new L dwarfs found by the EROS 2 proper-motion survey. We introduce a scheme for L dwarf classification that is based on an extension to cooler spectra of a pseudocontinuum ratio previously defined for M dwarfs. For calibrating the spectral subclasses, we use a temperature scale for late-M and L dwarfs recently obtained by Basri et al. from synthetic spectrum fitting of high-resolution profiles of Cs I and Rb I resonance lines. We define that the subclass range from L0 to L6 corresponds to the temperature range from 2200 K to 1600 K. Our subclasses L0, L1, and L2 agree with recent findings by Kirkpatrick et al., but then they diverge such that our L6 is equivalent to their L8. We find that late-M and L dwarf subclasses can be assigned either in the optical with the PC3 index or in the near-infrared with the H₂O H-band index. We discuss the main photospheric features present in L dwarf spectra, in particular in the region 400-650 nm, which has never been shown before. The TiO bands at 549.7, 559.7, 615.9, and 638.4 nm fade with decreasing temperature, but do not vanish until well inside the L domain (~L5). The Na I 589.0, 589.6 nm resonance doublet in our latest object (L6) becomes the broadest atomic feature ever seen in any cool dwarf. We do not detect H α emission in our L dwarfs later than L3. We discuss the ages and masses of our objects using their temperatures and absence or presence of lithium. Finally, we compare two L1 dwarfs with different gravities (one with lithium and one without it) and discuss differences in spectral features.

Publicación relevante: Si

- 23** Eduardo Martín; Wolfgang Brandner; Gibor Basri. A Search for Companions to Nearby Brown Dwarfs: The Binary DENIS-P J1228.2-1547. *Science*. 283 - 5408, pp. 1718 - 1721. American Association for the Advancement of Science, 03/03/1999.

Tipo de producción: Artículo científico

Posición de firma: 1

Nº total de autores: 3

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: Si

Citas: 117

Resultados relevantes: Descubrimiento de la primera binaria de masa subestelar usando imágenes del telescopio espacial Hubble

Publicación relevante: Si

- 24** Eduardo Martín. Weak and Post-T Tauri Stars around B-Type Members of the Scorpius-Centaurus OB Association. *The Astronomical Journal*. 115 - 1, pp. 351 - 367. IOP sciences, 01/01/1998.

Tipo de producción: Artículo científico

Tipo de soporte: Revista



Posición de firma: 1

Nº total de autores: 1

Fuente de citas: ADS

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: Si

Citas: 95

Resultados relevantes: I report medium-resolution (FWHM = 1.9 Å) spectroscopic observations of six H α emission-line stars proposed in 1993 by Meyer, Wilking, & Zinnecker to be T Tauri stars formed in the vicinity of the B1 giant sigma Sco, a bright member of the Sco-Cen OB association. Using spectroscopic criteria (spectral types, H α and Li i equivalent widths), which are distance-independent, I classify these stars in different pre-main-sequence (PMS) classes. Taking data from the literature, a number of stars detected by X-ray observations around other B-type members of Sco-Cen are also classified. The current census of "bona fide" low-mass PMS stars identified in about 9 deg² in Sco-Cen includes two classical T Tauri stars, 18 weak T Tauri stars (WTTs), and 10 post-T Tauri stars (PTTs). The presence of a mixture of T Tauri and post-T Tauri stars implies that previous results based on isochrone fitting that indicated an extremely young age (~1 Myr) for the Sco-Cen PMS low-mass population are incorrect. A distance of about 125 pc for Sco-Cen, instead of the 160 pc used in previous works, is consistent with the Hipparcos parallaxes for many of the B-type stars and would lead to older H-R diagram ages. Taking into account that PTTs are generally fainter and harder to identify than WTTs, I argue that the WTTs-to-PTTs ratio in Sco-Cen may be of order unity. This result suggests that the low-mass stars of the OB association span an age range similar to the B-type members (5-15 Myr), i.e., the low- and high-mass star populations are essentially coeval. Sco-Cen appears to be indeed a promising place to find many PTTs in future surveys.

Publicación relevante: Si

- 25** Eduardo Martín; Gibor Basri; Xavier Delfosse; Thierry Forveille. Keck HIRES spectra of the brown dwarf DENIS-P J1228.2-1547. *Astronomy and Astrophysics*. 327, pp. L29 - L32. EDP sciences, 10/11/1997.

Tipo de producción: Artículo científico

Posición de firma: 1

Nº total de autores: 4

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: Si

Citas: 117

Resultados relevantes: We report Keck high-resolution echelle spectroscopic observations of two very cool field dwarfs discovered by the near-IR photometric survey DENIS. DENIS-P J1228.2-1547 shows a conspicuous LiI resonance line that confirms it as an incontrovertible brown dwarf (BD). From the presence of Li, and its low surface temperature, we estimate from theoretical models a mass and an age upper limit of ~ 60 jupiters and ~ 10(9) years. The other DENIS object shows no detectable LiI line in our data, and thus we infer a mass \geq 60 jupiters for it. It could be a high-mass BD or very low-mass star. Both objects have modest radial velocities that suggest they are kinematically young. They show the strongest and broadest resonance line profiles from low ionization species ever seen. The extreme breadth of the KI lines are good further indicators of the expected high gravity in very low-mass dwarfs. We suggest a new spectral class, "L", for objects cooler than M-type (as these are) that do not show TiO molecular bands. The confirmation of at least one field BD in only ~ 1% of the final DENIS survey is a strong indication of the presence of a numerous population of these objects in the solar neighborhood. Based on observations obtained at the W.M. Keck Observatory, which is operated jointly by the University of California and the Californian Institute of Technology.

Publicación relevante: Si

- 26** Eduardo Martín. Quantitative spectroscopic criteria for the classification of pre-main sequence low-mass stars. *Astronomy and Astrophysics*. 321, pp. 492 - 496. EDP sciences, 05/05/1997.

Tipo de producción: Artículo científico

Posición de firma: 1

Nº total de autores: 1

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: Si

Citas: 92

Resultados relevantes: The discovery of hundreths of X-ray emitting stars possibly associated with pre-main sequence (PMS) low-mass stars far from molecular clouds, makes it necessary to adopt quantitative spectroscopic criteria for classifying them. T Tauri stars have young ages (<10Myr) and low masses ($M < 2M_{\text{sun}}$). As a

consequence, it is shown that they must verify two spectroscopic conditions: (1) spectral type in the range K0-M6, and either (2a) strong emission lines and UV-optical-NIR continuum excesses, or (2b) weak-emission lines and a photospheric $\text{LiI}\lambda 670.8$ absorption feature with a "minimum" equivalent width which depends on its spectral type. Classical T Tauris meet criteria (1) and (2a), while weak T Tauris (WTTS) meet criteria (1) and (2b). T Tauri stars occupy a different region in the $T_{\text{eff}}-W_{\text{Li}}$ diagramme than the low-mass members of young open clusters. Post T Tauri stars (PTTSs) later than about K2 can be clearly identified in the same diagramme because they fill an empty region (PTT-gap), intermediate between the T Tauris and the young cluster stars. The application of the spectroscopic criteria defined in this work to the PMS stars claimed to have been discovered in recent X-ray surveys of molecular clouds is hampered by the lack of high-resolution optical spectra for most of them. On the basis of the sparse and modest-resolution data that is available, the preliminary results indicate that the majority of these stars (~60%) are not WTTSs. Only ~25% of the non-WTTS X-ray discovered stars are clearly PTTs according to this study. The PMS status of the remaining stars is dubious. It seems unlikely that the PTTs identified in X-ray surveys outnumber the T Tauri stars. Far away from molecular clouds, the number of WTTSs and PTTs appear to decrease significantly.

Publicación relevante: Si

- 27** Eduardo Martín; Rafael Rebolo; Maria Rosa Zapatero Osorio. Spectroscopy of New Substellar Candidates in the Pleiades: Toward a Spectral Sequence for Young Brown Dwarfs. *The Astrophysical Journal*. 469, pp. 706 - 719. IOP sciences, 15/10/1996.

Tipo de producción: Artículo científico

Posición de firma: 1

Nº total de autores: 3

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: Si

Citas: 220

Resultados relevantes: We present optical and near-infrared spectroscopy (600-1000 nm) of eight faint ($I > 18$) very red ($R - I > 2.2$) objects discovered in a recent deep CCD survey of the Pleiades cluster by ZapateroOsorio, Rebolo, & Martin. We compare them with reliable cluster members like PP1 15 and Teide 1, and with several field very late type dwarfs (M4-M9.5), which were observed with similar instrumental configurations. Using pseudocontinuum ratios, we classify the new substellar candidates in a spectral sequence defined with reference to field stars of known spectral types. We also reclassify PP1 15 and Teide 1 in a self-consistent way. The likelihood of membership for the new candidates is assessed via the study of their photospheric features, H α emission, radial velocity, and consistency of their spectral types and I-band magnitudes with known cluster members. Four of the new substellar candidates are as late or later than PP1 15 (M6.5), but only one, namely, Calar 3 (M8), clearly meets all our membership criteria. It is indeed an object very similar to the brown dwarf Teide 1. Out of the eight new substellar candidates, our "cautious" membership analysis leaves only Calar 3 as a Pleiades brown dwarf with a high level of confidence. This object, together with Teide 1, allows one to compare the spectroscopic characteristics of Pleiades brown dwarfs with those of old very cool dwarfs. The overall spectral properties are similar, but there are slight differences in the NaI doublet (818.3 nm, 819.5 nm), VO molecular band (740 nm), and some spectral ratios, which are probably related to lower surface gravity in the young Pleiades brown dwarfs than in field stars. Finally, we propose a way of improving future CCD-based brown dwarf surveys by using narrowband near-IR pseudocontinuum filters.

Publicación relevante: Si

- 28** Rafael Rebolo; Maria Rosa Zapatero Osorio; Eduardo Martín. Discovery of a brown dwarf in the Pleiades star cluster. *Nature*. 377 - 6545, pp. 129 - 131. 15/09/1995.

Tipo de producción: Artículo científico

Posición de firma: 3

Nº total de autores: 3

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: No

Citas: 293

Resultados relevantes: BROWN dwarfs are cool star-like objects that have insufficient mass to maintain stable nuclear fusion in their interiors. Although brown dwarfs are not stars, they are expected to form in the same way, and their frequency of occurrence should reflect the trends seen in the birthrates of low-mass stars. But finding brown dwarfs has proved to be difficult, because of their low intrinsic luminosity. The nearby Pleiades star cluster is widely recognized as a likely host for detectable brown dwarfs because of its young age - the still-contracting

brown dwarfs should radiate a large fraction of their gravitational energy at near-infrared wavelengths. Here we report the discovery of a brown dwarf near the centre of the Pleiades. The luminosity and temperature of this object are so low that its mass must be less than 0.08 solar masses, the accepted lower limit on the mass of a true star¹⁻³. The detection of only one brown dwarf within our survey area is consistent with a smooth extrapolation of the stellar mass function of the Pleiades⁴, suggesting that brown dwarfs, although probably quite numerous in the Galactic disk, are unlikely to comprise more than ~1% of its mass.

Publicación relevante: Si

- 29** Eduardo Martín; Rafael Rebolo; Antonio Magazzù. Constraints to the Masses of Brown Dwarf Candidates from the Lithium Test. *The Astrophysical Journal*. 436, pp. 262 - 269. 01/11/1994.

Tipo de producción: Artículo científico

Posición de firma: 1

Nº total de autores: 3

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: Si

Citas: 72

Resultados relevantes: We present intermediate dispersion (0.7-2.2 Å~pix⁻¹) optical spectroscopic observations aimed at applying the "Lithium Test" to a sample of ten brown dwarf candidates located in the general field, two in young open clusters, and two in close binaries. We find evidence for strong Li depletion in all of them, and thus infer lower mass limits of 0.065~M_☉, depending only slightly (± 0.005~M_☉) on the interior models. None of the field brown dwarf candidates in our sample appears to be a very young (age < ~10⁸ yr) substellar object. For one of the faintest proper motion Pleiades members known (V=20.7) the Li test implies a mass greater than ~0.08~M_☉, and therefore it is not a brown dwarf. From our spectra we estimate spectral types for some objects and present measurements of H α emission strengths and radial velocities. Finally, we compare the positions in the H-R diagram of our sample of brown dwarf candidates with the theoretical region where Li is expected to be preserved (Substellar Lithium Region). We find that certain combinations of temperature calibrations and evolutionary tracks are consistent with the constraints imposed by the observed Li depletion in brown dwarf candidates, while others are not.

Publicación relevante: Si

- 30** Eduardo Martín; Rafael Rebolo; Antonio Magazzù. Pre-main sequence lithium burning. I. Weak T Tauri stars. *Astronomy and Astrophysics*. 282, pp. 503 - 517. EDP sciences, 01/02/1994.

Tipo de producción: Artículo científico

Posición de firma: 1

Nº total de autores: 4

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: Si

Citas: 141

Resultados relevantes: We derive lithium abundances in 53 T Tauri stars (TTS), concentrating on weak-line TTS. Our study gives the following results: 1) At luminosities $\geq 0.9 L_{\odot}$ the Li abundances are remarkably uniform, with a mean value, $\log N(\text{Li})=3.1$, equal to the "cosmic" lithium abundance. 2) Significant Li depletion appears below $0.5 L_{\odot}$ in the mass range $0.9-0.2 M_{\odot}$ and increases towards lower luminosities. At the lower mass end ($0.4-0.2 M_{\odot}$), the observed luminosity of the Li burning turning point is about a factor 4 higher than predicted by the models. At masses $1.2-1.0 M_{\odot}$ the observations imply less PMS Li burning than theoretically expected. Moreover we show that: 1) Low Li abundances appear only among stars with low $v \sin i$. Fast rotators with masses around $0.8 M_{\odot}$ do not show evidence for strong Li depletion towards lower luminosities as slow rotators do. 2) In a sample restricted to only K5-K7 stars we find that the angular momentum spread before Li burning begins is larger than a factor 10. Lithium depletion associated to angular momentum loss during PMS evolution is not required to explain the observed abundances. The efficiency of PMS Li burning in the mass range $0.9-0.7 M_{\odot}$ is reduced in the presence of rapid rotation.

Publicación relevante: Si

- 31** Antonio Magazzù; Eduardo Martín; Rafael Rebolo. Lithium in the pre-main sequence triple system UX Tauri. *Astronomy and Astrophysics*. 249 - 1, pp. 149 - 155. EDP sciences, 01/09/1991.

Tipo de producción: Artículo científico

Posición de firma: 2

Tipo de soporte: Revista

**Nº total de autores:** 3**Fuente de citas:** ADS**Grado de contribución:** Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo**Autor de correspondencia:** No**Citas:** 46

Resultados relevantes: High-resolution spectra (range 655-675 nm) are presented of the pre-main sequence triple system UX Tau. Favorable seeing conditions allowed detection of the spectra of the faintest component, where detection of the H-alpha and the Li-I 670.7 nm feature are reported. An estimate of effective temperature, luminosity, and mass leads to the conclusion that the object is a very young, very-low-mass object, close to the mass limit separating stars from brown dwarfs. Lithium abundances and the evolutionary status of the system are discussed, with special attention to the faint companion. A powerful observational test for evolutionary models of very-low-mass stars can come from lithium measurements, which can set restrictions to the maximum internal temperature attained by these objects.

Publicación relevante: Si

- 32** Johannes Sahlmann; Trent Dupuy; Adam Burgasser; Eduardo Martín; Daniela Bardalez Gagliuffi; Joe Filipazzo; Peter Lazorenko; Mike Liu. Individual dynamical masses of DENIS J063001.4-184014AB reveal a likely young brown dwarf triple. Monthly Notices of the Royal Astronomical Society. 500 - 4, pp. 5453 - 5461. Oxford, 11/01/2021.

Tipo de producción: Artículo científico**Posición de firma:** 5**Tipo de soporte:** Revista**Grado de contribución:** Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo**Autor de correspondencia:** No**Nº total de autores:** 9

Resultados relevantes: The binary nature of the M8.5 dwarf DENIS J063001.4-184014AB (DE0630-18) was discovered with astrometric monitoring from the ground, which determined the unresolved photocentric orbit and the trigonometric parallax of the system. Here we present radial velocity monitoring and resolved observations in the near-infrared with Keck aperture masking that allows us to measure the system's relative separation and brightness. By combining all available information, we determine the individual dynamical masses of the binary components to be $M_1=0.052\pm 0.009-0.008$ MSun and $M_2=0.052\pm 0.005-0.004$ MSun, both firmly in the substellar regime. These masses are surprising, given the object's M8.5 optical spectral type and equivalent absolute magnitude, and the significant difference in brightness between the components ($\Delta K = 1.74 \pm 0.06$ mag). Our results suggest that DE0630-18 is a relatively young system (~ 200 Myr) with a secondary component that is itself a potentially unresolved binary.

- 33** Johannes Sahlmann; Adam Burgasser; Daniela Bardalez Gagliuffi; Petro Lazorenko; Damien Ségransan; Maria Rosa Zapatero Osorio; Cullen Blake; Chris Gelino; Eduardo Martín; Hervé Bouy. Astrometric orbits of spectral binary brown dwarfs - I. Massive T dwarf companions to 2M1059-21 and 2M0805+48. Monthly Notices of the Royal Astronomical Society. 495 - 1, pp. 1136 - 1147. 01/06/2020.

Tipo de producción: Artículo científico**Posición de firma:** 9**Tipo de soporte:** Revista**Grado de contribución:** Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo**Autor de correspondencia:** No**Nº total de autores:** 10**Fuente de citas:** ADS**Citas:** 1

Resultados relevantes: Near-infrared spectroscopic surveys have uncovered a population of short-period, blended-light spectral binaries composed of low-mass stars and brown dwarfs. These systems are amenable to orbit determination and individual mass measurements via astrometric monitoring. Here, we present first results of a multiyear campaign to obtain high-precision absolute astrometry for spectral binaries using the Gemini-South and Gemini-North GMOS imagers. We measure the complete astrometric orbits for two systems: 2M0805+48 and 2M1059-21. Our astrometric orbit of 2M0805+48 is consistent with its 2-yr radial velocity orbit determined previously and we find a mass of $66\pm 5-14$ MJup for its T5.5 companion. For 2M1059-21, we find a 1.9-yr orbital period and a mass of $67\pm 4-5$ MJup for its T3.5 companion. We demonstrate that sub-milliarcsecond absolute astrometry can be obtained with both GMOS imagers and that this is an efficient avenue for confirming and characterizing ultracool binary systems.



- 34** Zheng Hua Zhang; Maria Cruz Gálvez Ortiz; David Pinfield; Adam Burgasser; Nicolas Lodieu; Hugh Jones; Eduardo Martín; Ben Burningham; Derek Homeier; France Allard; Maria Rosa Zapatero Osorio; Ricky Smart; Belén López Martí; Federico Marocco; Rafael Rebolo. Primeval very low-mass stars and brown dwarfs - IV. New L subdwarfs, Gaia astrometry, population properties, and a blue brown dwarf binary. *Monthly Notices of the Royal Astronomical Society*. 480 - 4, pp. 5447 - 5474. Oxford, 01/11/2018.

Tipo de producción: Artículo científico

Posición de firma: 7

Nº total de autores: 16

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: No

Citas: 16

Resultados relevantes: We present 27 new L subdwarfs and classify five of them as esdL and 22 as sdL. Our L subdwarf candidates were selected with the UKIRT Infrared Deep Sky Survey and Sloan Digital Sky Survey. Spectroscopic follow-up was carried out primarily with the OSIRIS spectrograph on the Gran Telescopio Canarias. Some of these new objects were followed up with the X-shooter instrument on the Very Large Telescope. We studied the photometric properties of the population of known L subdwarfs using colour-spectral type diagrams and colour-colour diagrams, by comparison with L dwarfs and main sequence stars, and identified new colour spaces for L subdwarf selection/study in current and future surveys. We further discussed the brown dwarf transition-zone and the observational stellar/substellar boundary. We found that about one-third of 66 known L subdwarfs are substellar objects, with two-thirds being very low-mass stars. We also present the Hertzsprung-Russell diagrams, spectral type-absolute magnitude corrections, and tangential velocities of 20 known L subdwarfs observed by the Gaia astrometry satellite. One of our L subdwarf candidates, ULAS J233227.03+123452.0, is a mildly metal-poor spectroscopic binary brown dwarf: a \sim L6p dwarf and a \sim T4p dwarf. This binary is likely a thick disc member according to its kinematics.

- 35** Mark Marks; Eduardo Martín; Víctor Sánchez Béjar; Nicolas Lodieu; Pavel Kroupa; Elena Manjavacas; Ingo Thies; Rafael Rebolo; Sergio Velasco. Using binary statistics in Taurus-Auriga to distinguish between brown dwarf formation processes}. *Astronomy & Astrophysics*. 605 - 1, pp. A11 - 22. *edp sciences*, 01/08/2017.

Tipo de producción: Artículo científico

Posición de firma: 2

Nº total de autores: 9

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: No

Citas: 4

Resultados relevantes: We employed a dynamical population synthesis model in which stellar binary formation is universal with a large binary fraction close to unity. Peripheral objects form separately in circumstellar disks with a distinctive initial mass function (IMF), their own orbital parameter distributions for binaries, and small binary fractions, according to observations and expectations from smoothed particle hydrodynamics (SPH) and grid-based computations. A small amount of dynamical processing of the stellar component was accounted for as appropriate for the low-density Taurus-Auriga embedded clusters. Results: The binary fraction declines strongly in the transition region between star-like and peripheral formation, exhibiting characteristic features. The location of these features and the steepness of this trend depend on the mass limits for star-like and peripheral formation. Such a trend might be unique to low density regions, such as Taurus, which host binary populations that are largely unprocessed dynamically in which the binary fraction is large for stars down to M-dwarfs and small for BDs. Conclusions: The existence of a strong decline in the binary fraction - primary mass diagram will become verifiable in future surveys on BD and VLMS binarity in the Taurus-Auriga star-forming region. The binary fraction - primary mass diagram is a diagnostic of the (non-)continuity of star formation along the mass scale, the separateness of the stellar and BD populations, and the dominant formation channel for BDs and BD binaries in regions of low stellar density hosting dynamically unprocessed populations.

- 36** Phan Bao Ngoc; Mike Bessell; Don Nguyen; Eduardo Martín; Paul Ho; C. Lee; H. Parsons. Detection of lithium in nearby young late-M dwarfs. *Astronomy & Astrophysics*. 600, pp. A19 - 9 pages. *EDP sciences*, 01/04/2017.

Tipo de producción: Artículo científico

Posición de firma: 4

Nº total de autores: 7

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: No

Fuente de citas: ADS**Citas:** 4

Resultados relevantes: Late M-type dwarfs in the solar neighborhood include a mixture of very low-mass stars and brown dwarfs that is difficult to disentangle due to the lack of constraints on their age, such as trigonometric parallax, lithium detection, and space velocity. **Aims:** We search for young brown dwarf candidates among a sample of 28 nearby late-M dwarfs with spectral types between M5.0 and M9.0, and we also search for debris disks around three of them. **Methods:** Based on theoretical models, we used the color I-J, the J-band absolute magnitude, and the detection of the Li I 6708 Å doublet line as a strong constraint to estimate masses and ages of our targets. For the search of debris disks, we observed three targets at submillimeter wavelength of 850 μm. **Results:** We report here the first clear detections of lithium absorption in four targets and a marginal detection in one target. Our mass estimates indicate that two of them are young brown dwarfs, two are young brown dwarf candidates, and one is a young very low-mass star. The closest young field brown dwarf in our sample at only 15 pc is an excellent benchmark for further studying physical properties of brown dwarfs in the range 100-150 Myr. We did not detect any debris disks around three late-M dwarfs, and we estimated upper limits to the dust mass of debris disks around them.

- 37** Nicolas Lodieu; Marisa Espinoza Contreras; Maria Rosa Zapatero Osorio; Enrique Solano; Miriam Aberasturi; Eduardo Martín; Carlos Rodrigo. New ultracool subdwarfs identified in large-scale surveys using Virtual Observatory tools. *Astronomy & Astrophysics*. 598 - 1, pp. A92 - 118. edp sciences, 01/02/2017.

Tipo de producción: Artículo científico**Posición de firma:** 6**Nº total de autores:** 7**Fuente de citas:** ADS**Tipo de soporte:** Revista**Grado de contribución:** Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo**Autor de correspondencia:** No**Citas:** 13

Resultados relevantes: We carried out a search cross-matching the Sloan Digital Sky Survey (SDSS) Data Release 7 (DR7) and the Two Micron All Sky Survey (2MASS), and different releases of SDSS and the United Kingdom InfraRed Telescope (UKIRT) Infrared Deep Sky Survey (UKIDSS) using STILTS, Aladin, and Topcat developed as part of the Virtual Observatory tools. We considered different photometric and proper motion criteria for our selection. We identified 29 and 71 late-type subdwarf candidates in each cross-correlation over 8826 and 3679 sq. deg, respectively (2312 sq. deg overlap). We obtained our own low-resolution optical spectra for 71 of our candidates: 26 were observed with the Gran Telescopio de Canarias (GTC; R 350, λλ5000-10 000 Å), six with the Nordic Optical Telescope (NOT; R 450, λλ5000-10 700 Å), and 39 with the Very Large Telescope (VLT; R 350, λλ6000-11 000 Å). We also retrieved spectra for 30 of our candidates from the SDSS spectroscopic database (R 2000 and λλ 3800-9400 Å), nine of these 30 candidates with an independent spectrum in our follow-up. We classified 92 candidates based on 101 optical spectra using two methods: spectral indices and comparison with templates of known subdwarfs. **Results:** We developed an efficient photometric and proper motion search methodology to identify metal-poor M dwarfs. We confirmed 86% and 94% of the candidates as late-type subdwarfs from the SDSS vs. 2MASS and SDSS vs. UKIDSS cross-matches, respectively. These subdwarfs have spectral types ranging between M5 and L0.5 and SDSS magnitudes in the r = 19.4-23.3 mag range. Our new late-type M discoveries include 49 subdwarfs, 25 extreme subdwarfs, six ultrasubdwarfs, one subdwarf/extreme subdwarf, and two dwarfs/subdwarfs. In addition, we discovered three early-L subdwarfs to add to the current compendium of L-type subdwarfs known to date. We doubled the numbers of cool subdwarfs (11 new from SDSS vs. 2MASS and 50 new from SDSS vs. UKIDSS). We derived a surface density of late-type subdwarfs of 0.040 per square degree in the SDSS DR7 vs. UKIDSS LAS DR10 cross-match (J = 15.9-18.8 mag) after correcting for incompleteness. The density of M dwarfs decreases with decreasing metallicity. We also checked the Wide Field Survey Explorer (AllWISE) photometry of known and new subdwarfs and found that mid-infrared colours of M subdwarfs do not appear to differ from their solar-metallicity counterparts of similar spectral types. However, the near-to-mid-infrared colours J-W2 and J-W1 are bluer for lower metallicity dwarfs, results that may be used as a criterion to look for late-type subdwarfs in future searches.

- 38** Maria Rosa Zapatero Osorio; Nicolas Lodieu; Víctor Sánchez Béjar; Eduardo Martín; Víctor Ivanov; Amelia Bayo; Henri Boffin; Dante Minitti; Juan Carlos Beamín. Near-infrared photometry of WISE J085510.74-071442.5. *Astronomy & Astrophysics*. 592, pp. A80 - 9. EDP sciences, 10/08/2016.

Tipo de producción: Artículo científico**Posición de firma:** 4**Tipo de soporte:** Revista**Grado de contribución:** Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo



Nº total de autores: 10
Fuente de citas: ADS

Autor de correspondencia: No
Citas: 5

Resultados relevantes: We aim at obtaining near-infrared photometry and deriving the mass, age, temperature, and surface gravity of WISE J085510.74-071442.5 (J0855-0714), which is the coolest object beyond the solar system currently known. Methods: We used publicly available data from the archives of the Hubble Space Telescope (HST) and the Very Large Telescope (VLT) to determine the emission of this source at 1.153 μm (F110W) and 1.575 μm (CH4-off). J0855-0714 was detected at both wavelengths with a signal-to-noise ratio of ≈ 10 (F110W) and ≈ 4 (CH4-off) at the peak of the corresponding point-spread-functions. Results: This is the first detection of J0855-0714 in the H-band wavelengths. We measured 26.31 ± 0.10 and 23.22 ± 0.35 mag in F110W and CH4-off (Vega system). J0855-0714 remains unresolved in the HST images that have a spatial resolution of 0.22". Companions at separations of 0.5 AU (similar mass and brightness) and at ~ 1 AU (≈ 1 mag fainter in the F110W filter) are discarded. By combining the new data with published photometry, including non-detections, we build the spectral energy distribution of J0855-0714 from 0.89 through 22.09 μm , and contrast it against current solar-metallicity models of planetary atmospheres. We determine that the best spectral fit yields a temperature of 225-250 K, a bolometric luminosity of $\log L/L_{\odot} = -8.57$, and a high surface gravity of $\log g = 5.0$ (cm s^{-2}), which suggests an old age although a gravity this high is not fully compatible with evolutionary models. After comparing our data with the cooling theory for brown dwarfs and planets, we infer a mass in the interval 2-10 M_{Jup} for ages of 1-12 Gyr and high atmospheric gravities of $\log g \leq 3.5$ (cm s^{-2}). If it had the age of the Sun, J0855-0714 would be a ≈ 5 - M_{Jup} free-floating planetary-mass object. Conclusions: J0855-0714 meets the mass values previously determined for free-floating planetary-mass objects discovered in star-forming regions and young stellar clusters. Based on extrapolations of the substellar mass functions of young clusters to the field, as many J0855-0714-like objects as M5-L2 stars may be expected to populate the solar neighborhood.

- 39** Johannes Sahlmann; Peter Lazorenko; Hervé Bouy; Eduardo Martín; Didier Queloz; Damien Ségransan; Maria Rosa Zapatero Osorio. Parallax of the L4.5 dwarf 2M1821+14 from high-precision astrometry with OSIRIS at GTC. Monthly Notices of the Royal Astronomical Society. 455 - 1, pp. 357 - 369. Oxford Academic Press, 01/01/2016.

Tipo de producción: Artículo científico
Posición de firma: 4

Tipo de soporte: Revista
Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Nº total de autores: 7
Fuente de citas: ADS

Autor de correspondencia: No
Citas: 13

Resultados relevantes: We used the OSIRIS camera at the 10.4 m Gran Telescopio Canarias (GTC) to monitor the astrometric motion of the L4.5 dwarf 2M1821+14 over 17 months. The astrometric residuals of 11 epochs have an rms dispersion of 0.4 mas, which is larger than the average precision of 0.23 mas per epoch and hints towards an additional signal or excess noise. Comparison of the point-spread functions in OSIRIS and FORS2/VLT images reveals no differences critical for high-precision astrometry, despite the GTC's segmented primary mirror. We attribute the excess noise to an unknown effect that may be uncovered with additional data. For 2M1821+14, we measured a relative parallax of 106.15 ± 0.18 mas and determined a correction of 0.50 ± 0.05 mas to absolute parallax, leading to a distance of 9.38 ± 0.03 pc. We excluded at 3σ confidence the presence of a companion to 2M1821+14 down to a mass ratio of 0.1 ($\approx 5 M_{\text{Jupiter}}$) with a period of 50-1000 d and a separation of 0.1-0.7 au. The accurate parallax allowed us to estimate the age and mass of 2M1821+14 of 120-700 Myr and $0.049^{+0.014}_{-0.024} M_{\odot}$, thus confirming its intermediate age and substellar mass. We complement our study with a parallax and proper motion catalogue of 587 stars ($l' \approx 15.5$ -22) close to 2M1821+14, used as astrometric references. This study demonstrates submas astrometry with the GTC, a capability applicable for a variety of science cases including the search for extrasolar planets and relevant for future astrometric observations with E-ELT and TMT.

- 40** Johannes Sahlmann; Adam Burgasser; Eduardo Martín; Peter Lazorenko; Daniela Bardalez Gagliuffi; Michel Mayor; Damien Ségransan; Didier Queloz; Stephane Udry. DE0823-49 is a juvenile binary brown dwarf at 20.7 pc. Astronomy & Astrophysics. 579 - 1, pp. A61 - 70. edp sciences, 01/07/2015.

Tipo de producción: Artículo científico
Posición de firma: 3

Tipo de soporte: Revista
Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Nº total de autores: 9
Fuente de citas: ADS

Autor de correspondencia: No
Citas: 9

Resultados relevantes: Astrometric monitoring of the nearby early-L dwarf DE0823-49 has revealed a low-mass companion in a 248-day orbit that was announced in an earlier work. Here, we present new astrometric and spectroscopic observations that allow us to characterise the system in detail. The optical spectrum shows Li i-absorption indicative of a young age and/or substellar mass for the primary component. The near-infrared spectrum is best reproduced by a binary system of brown dwarfs with spectral types of L1.5 + L5.5 and effective temperatures of 2150 ± 100 K and 1670 ± 140 K. To conform with the photocentric orbit size measured with astrometry and the current understanding of substellar evolution, the system must have an age in the 80-500 Myr range. Evolutionary models predict component masses in the ranges of $M_1 \approx 0.028-0.063 M_{\odot}$ and $M_2 \approx 0.018-0.045 M_{\odot}$ with a mass ratio of $q \approx 0.64-0.74$. Multi-epoch radial velocity measurements unambiguously establish the three-dimensional orbit of the system and allow us to investigate its kinematic properties. DE0823-49 emerges as a rare example of a nearby brown dwarf binary with orbit, component properties, and age that are characterised well. It is a juvenile resident of the solar neighbourhood, but does not appear to belong to a known young association or moving group.

- 41** Eduardo Martín; Juan Cabrera; Eder Martioli; Enrique Solano; Ramarao Tata. Kepler observations of very low-mass stars. *Astronomy & Astrophysics*. 555 - 1, pp. A108 - 119. EDP sciences, 01/07/2013.

Tipo de producción: Artículo científico

Posición de firma: 1

Nº total de autores: 5

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: Si

Citas: 14

Resultados relevantes: Observations of very low-mass stars with Kepler represent an excellent opportunity to search for planetary transits and to characterize optical photometric variability at the cool end of the stellar mass distribution. In this paper, we present low-resolution red optical spectra that allow us to identify 18 very low-mass stars that have Kepler light curves available in the public archive. Spectral types of these targets are found to lie in the range dM4.5-dM8.5, implying spectrophotometric distances from 17 pc to 80 pc. Limits to the presence of transiting planets are set by modeling of the Kepler light curves. We find that the size of the planets detectable by Kepler around these small stars typically lies in the range 1 to 5 Earth radii within the habitable regions ($P \leq 10$ days). We identify one candidate transit with a period of 1.26 days whose light curve resembles a planet slightly smaller than the Moon. However, our pixel by pixel analysis of the Kepler data shows that the signal most likely arises from a background contaminating eclipsing binary. For 11 of these objects reliable photometric periods shorter than 7 days are derived, and are interpreted as rotational modulation of magnetic cool spots. For 3 objects we find possible photometric periods longer than 50 days that require confirmation. The H α emission measurements and flare rates are used as proxies for chromospheric activity, and transversal velocities are used as an indicator of dynamical ages. These data allow us to discuss the relationship between magnetic activity and detectability of planetary transits around very low-mass stars. We show that super-Earth planets with sizes around 2 Earth radii are detectable with Kepler around about two thirds of the stars in our sample, independently of their level of chromospheric activity.

- 42** Eduardo Martín. Exoplanet plenitude. *Advances in Astronomy and Space Physics*. 2 - 1, pp. 109 - 113. 01/11/2012.

Tipo de producción: Artículo científico

Posición de firma: 1

Nº total de autores: 1

Resultados relevantes: The main aim of the present paper is to give a brief overview of the revolution in exoplanet discoveries which started about two decades ago and the new concepts and perspectives that these observational findings have brought about. The level of the text is simple, as deemed suitable for reading by young scientists with different levels of expertise. The paper is organized in the following sections: 1) Historical background. 2) Basic concepts and definitions of what is a planet. 3) Observational evidence of planetary diversity and the theoretical pathways to explain what we see. 4) Future research directions.

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: Si

- 43** Eduardo Martín; Henk Spruit; Ramarao Tata. A binary merger origin for inflated hot Jupiter planets. *Astronomy and Astrophysics*. 535 - 1, pp. A50 - 56. EDP sciences, 01/11/2011.

Tipo de producción: Artículo científico

Tipo de soporte: Revista

**Posición de firma:** 1**Nº total de autores:** 3**Fuente de citas:** ADS**Grado de contribución:** Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo**Autor de correspondencia:** Si**Citas:** 30

Resultados relevantes: We hypothesize that hot Jupiters with inflated sizes represent a separate planet formation channel, the merging of two low-mass stars. We show that the abundance and properties of W UMa stars and low mass detached binaries are consistent with their being possible progenitors. The degree of inflation of the transiting hot Jupiters correlates with their expected spiral-in life time by tidal dissipation, and this could indicate youth if the stellar dissipation parameter Q^* is sufficiently low. Several Jupiter-mass planets can form in the massive compact disk formed in a merger event. Gravitational scattering between them can explain the high incidence of excentric, inclined, and retrograde orbits. If the population of inflated planets is indeed formed by a merger process, their frequency should be much higher around blue stragglers than around T Tauri stars.

- 44** Luisa Valdivielso; Pedro Esparza; Eduardo Martín; Dan Maukonen; Robert Peale. A New Gas Cell for High-precision Doppler Measurements in the Near-infrared. The Astrophysical Journal. 715 - 2, pp. 1366 - 1369. 01/06/2010.

Tipo de producción: Artículo científico**Posición de firma:** 3**Nº total de autores:** 5**Fuente de citas:** ADS**Tipo de soporte:** Revista**Grado de contribución:** Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo**Autor de correspondencia:** Si**Citas:** 9

Resultados relevantes: High-resolution spectroscopy in the near-infrared could become the leading method for discovering extra-solar planets around very low mass stars and brown dwarfs. In order to help to achieve an accuracy of $\sim m s^{-1}$, we are developing a gas cell which consists of a mixture of gases whose absorption spectral lines span all over the near-infrared region. We present the most promising mixture, made of acetylene, nitrous oxide, ammonia, chloromethanes, and hydrocarbons. The mixture is contained in a small size 13 cm long gas cell and covers most of the H and K bands. It also shows small absorptions in the J band, but they are few and not sharp enough for near-infrared wavelength calibration. We describe the working method and experiments, and compare our results with the state of the art for near-infrared gas cells.

- 45** Maria Rosa Zapatero Osorio; Eduardo Martín; Carlos del Burgo; Rohit Deshpande; Florian Rodler; Michele Montgomery. Infrared radial velocities of VB10. Astronomy and Astrophysics. 505 - 1, pp. L5 - L8. EDP sciences, 01/10/2009.

Tipo de producción: Artículo científico**Posición de firma:** 2**Nº total de autores:** 6**Fuente de citas:** ADS**Tipo de soporte:** Revista**Grado de contribución:** Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo**Autor de correspondencia:** No**Citas:** 19

Resultados relevantes: We present radial velocities of the M8V-type, very low-mass star vB 10 obtained at four different epochs between 2001 and 2008. We use high-resolution ($R \sim 20\,000$) near-infrared (J-band) spectra taken with the nirspec instrument on the Keck II telescope. Our data suggest that vB 10 shows radial velocity variability with an amplitude of $\sim 1 km s^{-1}$, a result that is consistent with the recent finding of a massive planet companion around the star. More velocity measurements and a better sampling of the orbital phase are required to precisely constrain the orbital parameters and the individual masses of the pair.

- 46** Enric Pallé; Maria Rosa Zapatero Osorio; Rafael Barrena; Pilar Montañés Rodríguez; Eduardo Martín. Earth's transmission spectrum from lunar eclipse observations. Nature. 459 - 7248, pp. 814 - 816. 01/06/2009.

Tipo de producción: Artículo científico**Posición de firma:** 6**Nº total de autores:** 6**Fuente de citas:** ADS**Tipo de soporte:** Revista**Grado de contribución:** Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo**Autor de correspondencia:** No**Citas:** 99

Resultados relevantes: Of the 342 planets so far discovered orbiting other stars, 58 'transit' the stellar disk, meaning that they can be detected through a periodic decrease in the flux of starlight. The light from the star passes through the atmosphere of the planet, and in a few cases the basic atmospheric composition of the planet can be estimated. As we get closer to finding analogues of Earth, an important consideration for the characterization of extrasolar planetary atmospheres is what the transmission spectrum of our planet looks like. Here we report the optical and near-infrared transmission spectrum of the Earth, obtained during a lunar eclipse. Some biologically relevant atmospheric features that are weak in the reflection spectrum (such as ozone, molecular oxygen, water, carbon dioxide and methane) are much stronger in the transmission spectrum, and indeed stronger than predicted by modelling. We also find the 'fingerprints' of the Earth's ionosphere and of the major atmospheric constituent, molecular nitrogen (N₂), which are missing in the reflection spectrum.

- 47** Víctor Sánchez Béjar; Maria Rosa Zapatero Osorio; Antonio Pérez Garrido; Carlos Alvarez; Eduardo Martín; Rafael Rebolo. Discovery of a Wide Companion near the Deuterium-burning Mass Limit in the Upper Scorpius Association. *The Astrophysical Journal Letters*. 673 - 2, pp. L185 - L189. 01/02/2008.

Tipo de producción: Artículo científico

Posición de firma: 5

Nº total de autores: 8

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: No

Citas: 72

Resultados relevantes: We present the discovery of a companion near the deuterium-burning mass limit located at a very wide distance, at an angular separation of 4.6" +/- 0.1" (projected distance of ~ 670 AU) from UScoCTIO 108, a brown dwarf of the very young Upper Scorpius association. Optical and near-infrared photometry and spectroscopy confirm the cool nature of both objects, with spectral types of M7 and M9.5, respectively, and that they are bona fide members of the association, showing low gravity and features of youth. Their masses, estimated from the comparison of their bolometric luminosities and theoretical models for the age range of the association, are 60 +/- 20 and 14+2-8 MJup, respectively. The existence of this object around a brown dwarf at this wide orbit suggests that the companion is unlikely to have formed in a disk based on current planet formation models. Because this system is rather weakly bound, they probably did not form through dynamical ejection of stellar embryos.

- 48** Yakiv Pavlenko; Hugh Jones; Eduardo Martín; Eike Guenther; Matt Kenworthy; Maria Rosa Zapatero Osorio. Lithium in LP944-20. *Monthly Notices of the Royal Astronomical Society*. 380 - 3, pp. 1285 - 1296. Oxford, 01/09/2007.

Tipo de producción: Artículo científico

Posición de firma: 3

Nº total de autores: 6

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: No

Citas: 22

Resultados relevantes: We present a new estimate of the lithium abundance in the atmosphere of the brown dwarf LP944-20. Our analysis is based on a self-consistent analysis of low-, intermediate- and high-resolution optical and near-infrared spectra. We obtain $\log N(\text{Li}) = 3.25 \pm 0.25$ using fits of our synthetic spectra to the LiI resonance line doublet profiles observed with Very Large Telescope/Ultraviolet-Visual Echelle Spectrograph (VLT/UVES) and Anglo-Australian Telescope/Segmented Pupil/Image Reformatting Array of Lenslets (AAT/SPIRAL). This lithium abundance is over two orders of magnitude larger than previous estimates in the literature. In order to obtain good fits of the resonance lines of KI and RbI and better fits to the TiO molecular absorption around the LiI resonance line, we invoke a semi-empirical model atmosphere with the dusty clouds located above the photosphere. The lithium abundance, however, is not changed by the effects of the dusty clouds. We discuss the implications of our estimate of the lithium abundance in LP944-20 for the understanding of the properties of this benchmark brown dwarf. Based on observations obtained on the European Southern Observatory at Cerro Paranal, Chile, in programs 68.C-0063(A) and 072.C-0110(B), the Anglo-Australian Telescope at Siding Springs Observatory during commissioning observations for SPIRAL (Segmented Pupil/Image Reformatting Array of Lenslets) instrument and the Keck Observatory in Mauna Kea, Hawaii.

- 49** Eduardo Martín; Antonio Magazzù; Xavier Delfosse; Robert Mathieu. The pre-main sequence spectroscopic binary UZ Tau East: Improved orbital parameters and accretion phase dependence. *Astronomy and Astrophysics*. 429, pp. 939 - 943. EDP sciences, 11/01/2005.

Tipo de producción: Artículo científico

Posición de firma: 1

Nº total de autores: 4

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: Si

Citas: 23

Resultados relevantes: We present radial-velocity measurements obtained using high- and intermediate-resolution spectroscopic observations of the classical T Tauri star UZ Tau East from 1994 to 1996. We also provide measurements of H α equivalent widths and optical veiling. Combining our radial-velocity data with those recently reported by Prato et al. (2002), we improve the orbital elements for this spectroscopic binary. The orbital period is 18.979 ± 0.007 days and the eccentricity is $e=0.14$. We find variability in the H α emission and veiling, signposts of accretion, but at periastron passage the accretion is not as clearly enhanced as in the case of the binary DQ Tau. The difference in the behaviour of these two binaries is consistent with the hydrodynamical models of accretion from circumbinary disks because UZ Tau East has lower eccentricity than DQ Tau. It seems that enhanced periastron accretion may occur only in systems with very high eccentricity ($e > 0.5$).

- 50** Antonio Magazzù; Eduardo Martín; Rafael Rebolo. A Spectroscopic Test for Substellar Objects. *Astrophysical Journal Letters*. 404, pp. L17 - L20. IOP sciences, 01/02/1993.

Tipo de producción: Artículo científico

Posición de firma: 2

Nº total de autores: 3

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: No

Citas: 122

Resultados relevantes: We describe a spectroscopic test capable of providing direct confirmation of the substellar nature of brown dwarf candidates. While the conditions for substantial lithium burning are reached even in very low-mass stars, in substellar objects with less than 0.06 solar mass such conditions are never attained and Li is expected to be preserved. Therefore, the detection of lithium in the spectrum of a brown dwarf candidate would be of great interest to confirm its substellar mass. We report on a search for the Li I 670.8 nm resonance doublet in some very low-mass dwarfs and brown dwarf candidates, namely, GL 65 (A and B), GL 406, GL 234AB, GL 569B, and GL 473AB. We do not detect the lithium feature in any of the spectra of this work. This implies that the objects in our sample have suffered from heavy Li depletion (more than four orders of magnitude in most cases). These objects consequently present masses higher than 0.06 solar mass and appear to be older than about 10×8 yr.

- 51** Eduardo Martín; Rafael Rebolo; Jorge Casares; Phil Charles. High lithium abundance in the secondary of the black-hole binary system V404 Cygni. *Nature*. 358 - 3682, pp. 129 - 131. 01/07/1992.

Tipo de producción: Artículo científico

Posición de firma: 1

Nº total de autores: 4

Fuente de citas: ADS

Tipo de soporte: Revista

Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo

Autor de correspondencia: Si

Citas: 62

Resultados relevantes: The maximum abundance of lithium in the oldest stars of the Galaxy is a factor of ten less than that of young stars and the local interstellar medium¹, prompting an active search for sources of lithium. Type II supernovae, novae and accretion disks around black holes may be important sites of lithium production^{2,3}. Stars in general are unlikely to produce lithium, as it is destroyed in their interiors through (p, α) reactions. Recently we showed that the transient X-ray source V404 Cyg is a low-mass X-ray binary with a black-hole primary⁴. Here we describe the discovery of lithium in the spectrum of V404 Cyg, as has also been noted independently by Wallerstein⁵ in our previously published spectra⁴. We derive a high lithium abundance in the secondary star of V404 Cyg, close to that of very young stars. Without lithium production, the secondary would have to be comparable in age to the Pleiades cluster (~ 100 Myr). If we are not seeing the system at an early moment in its lifetime, there must have been lithium production, which could be associated either with the supernova explosion



that created it, or with the accretion disk now there. Further observations of this and similar systems may reveal that they are important sources of galactic lithium enrichment.

- 52** Rafael Rebolo; Eduardo Martín; Antonio Magazzù. Spectroscopy of a Brown Dwarf Candidate in the alpha Persei Open Cluster}. The Astrophysical Journal Letters. 389, pp. L83. 01/04/1992.
Tipo de producción: Artículo científico
Posición de firma: 2
Nº total de autores: 3
Fuente de citas: ADS
Tipo de soporte: Revista
Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo
Autor de correspondencia: No
Citas: 220
Resultados relevantes: Intermediate-resolution spectroscopy in the range 625-775 nm is reported for a faint very-late-type object discovered in two CCD images taken near the center of the Alpha Per cluster. The spectrum shows strong absorption molecular bands, H-alpha emission, and KI absorption typical of late-M dwarfs; H-alpha varies conspicuously. The effective temperature and luminosity derived from the spectrum and R,I band photometry are consistent with those expected for an Alpha Per (age of about 50 Myr) 0.07 solar mass substellar object. In this object the lithium resonance line at 670.8 nm should be detectable with higher resolution, higher SNR data, and this line is a potentially powerful spectroscopic discriminant between very low mass stars and brown dwarfs close to the substellar mass limit.
- 53** Gibor Basri; Eduardo Martín; Claude Bertout. The lithium resonance line in T Tauri stars. Astronomy and Astrophysics. 252, pp. 625 - 638. EDP sciences, 01/12/1991.
Tipo de producción: Artículo científico
Posición de firma: 2
Nº total de autores: 3
Fuente de citas: ADS
Tipo de soporte: Revista
Grado de contribución: Autor/a o coautor/a de artículo en revista con comité evaluador de admisión externo
Autor de correspondencia: No
Citas: 106
Resultados relevantes: High-resolution spectra provide evidence of the Li-I 6707 line in 28 of the stars, and the significance of the results is discussed. The Li-I equivalent widths are presented after correcting for continuum veiling with actual measurements of the veiling itself. Surface spots are found to have a complex effect on the width of the photospheric lines, and the width of the line for V 410 Tau does not appear to change with spot coverage. The results indicate that the model atmospheres and stellar parameters for the T-Tauri stars lead to errors in calculating the Li abundances. The stars have higher Li abundances than meteorites and the local ISM if the T-Tauri stars are hotter than late K. Several effects are discussed which are of an unusual nature including the Li depletion among young low-mass Taurus-Auriga objects and the homogeneous nature of Li depletion among stars with strong and weak emission lines.
- 54** Eduardo Martín Guerrero de Escalante. Astronomía Made in Spain. pp. 63 - 64. Sociedad Española de Astronomía, 18/02/2009. ISBN 9788461298839
Tipo de producción: Artículo de divulgación
Posición de firma: 1
Nº total de autores: 1
Tipo de soporte: Libro
Grado de contribución: Autor/a o coautor/a de documento científico o técnico de difusión
Autor de correspondencia: Si
Resultados relevantes: Contribución invitada en la recopilación de los artículos que los astrónomos españoles publicaron durante 30 años en las revistas Nature y Science que fueron galardonadas con el premio Príncipe de Asturias en 2007. El libro fue editado por Benjamín Montesinos Comino y Emilio J. Alfaro Navarro en conmemoración del año internacional de la Astronomía en 2009.
- 55** Eduardo Martín; Rafael Rebolo; Maria Rosa Zapatero Osorio. The Discovery of Brown Dwarfs. American Scientist. 85 - 6, pp. 522 - 528. Sigma Xi, 03/12/1997.
Tipo de producción: Artículo de divulgación
Posición de firma: 1
Nº total de autores: 3
Tipo de soporte: Revista
Grado de contribución: Autor/a o coautor/a de documento científico o técnico de difusión
Autor de correspondencia: Si

**Fuente de citas:** ADS**Citas:** 12**Resultados relevantes:** Artículo invitado acerca del descubrimiento de las primeras enanas marrones**56** Luisa Lara; Gillem Anglada; Eduardo Martín. Libro blanco CSIC 2030. CSIC, 24/02/2021.**Tipo de producción:** Capítulo de libro**Tipo de soporte:** Libro**Grado de contribución:** Autor/a o coautor/a de capítulo de libro**Autor de correspondencia:** No**57** Víctor Sánchez Béjar; Eduardo Martín. Brown Dwarfs and Free-Floating Planets in Young Stellar Clusters. Handbook of Exoplanets. pp. 469 - 501. Springer International Publishing AG, part of Springer Nature, 03/11/2018. ISBN 978-3-319-55332-0**Tipo de producción:** Capítulo de libro**Tipo de soporte:** Libro**Posición de firma:** 2**Grado de contribución:** Autor/a o coautor/a de capítulo de libro**Nº total de autores:** 1**Autor de correspondencia:** Si**Fuente de citas:** ADS**Citas:** 1

Resultados relevantes: Brown dwarfs are substellar objects unable to stably fuse hydrogen in their interior. Since the discovery of the first brown dwarf in an open cluster, namely, Teide 1 (Rebolo et al. Nature 377:129-131, 1995), many searches for substellar objects have been carried out in young stellar clusters and associations, such as Pleiades, Orion, Upper Scorpius, Taurus, Chamaeleon, α Persei, Hyades, or Praesepe. The lithium test has proven to be a very useful tool to distinguish between brown dwarfs and stars and to determine the ages of young open clusters. Young substellar objects show spectral features that are sensitive to surface gravity, which is expected to be lower than in older field counterparts of similar effective temperature. The studies of the substellar mass function indicate that brown dwarfs are very numerous, about one-third of the total number of stars, but their contribution in mass is lower than 10%. The formation of substellar objects extends below the deuterium-burning mass limit, which is the realm of the so-called free-floating or isolated planetary-mass objects that overlap with the masses of exoplanets.

58 Eduardo Martín; Maria Rosa Zapatero Osorio. A decade of brown dwarfs and exoplanets: Implications for the search for life in the Universe. Fundamentals and Challenges in Astrobiology. 37 - 661, pp. 151 - 170. Kerala(India): Research Signpost, 01/12/2005. ISBN 81-308-0041-1**Tipo de producción:** Capítulo de libro**Tipo de soporte:** Libro**Posición de firma:** 1**Grado de contribución:** Autor/a o coautor/a de capítulo de libro**Nº total de autores:** 2**Autor de correspondencia:** Si

Resultados relevantes: Capítulo de libro sobre Astrobiología editado por Manolo Vázquez. En este capítulo se hace una revisión de la primera década de descubrimientos de objetos de masa subestelar (enanas marrones y exoplanetas) y se discute su relevancia para entender la formación de estrellas y planetas y el origen de la vida en el Universo.

59 Eduardo Lorenzo Martín; Juan Ge; Wei-Peng Lin. Research, Science and Technology of Brown Dwarfs and Exoplanets. Research, Science and Technology of Brown Dwarfs and Exoplanets. 16, pp. 01001 - 07006. EDP sciences, 10/08/2011. ISBN 978-2-7598-0664-5**Tipo de producción:** Libro o monografía científica**Tipo de soporte:** Libro**Posición de firma:** 1**Grado de contribución:** Editor/a o coeditor/a**Nº total de autores:** 3**Autor de correspondencia:** Si

Resultados relevantes: Un libro que contiene 53 artículos acerca de Enanas Marrones y Exoplanetas escritos por autores procedentes de los cinco continentes que se juntaron en Shangai (China) en julio del 2009 en un congreso auspiciado por el Observatorio de Shangai, la academia China de ciencias, las fundaciones nacionales de ciencia de China y Estados Unidos de América, así como varias universidades chinas.

Publicación relevante: Si



- 60** Eduardo Martín; Antonio Magazzù. Ultra-low mass star formation and evolution. *Astronomische Nachrichten*. 326 - 10, pp. 873 - 1071. Wiley - VCH Verlag, 01/11/2005.
Tipo de producción: Libro o monografía científica
Posición de firma: 1
Nº total de autores: 2
Resultados relevantes: Compendio de 47 artículos editados por los autores y presentados en el congreso "Ultra-low mass star formation and evolution" celebrado en La Palma del 28 de Junio al 2 de Julio del 2005 y auspiciado por la Fundación Galileo Galilei y el Instituto de Astrofísica de Canarias.
Publicación relevante: Si
Tipo de soporte: Libro
Grado de contribución: Editor/a o coeditor/a
Autor de correspondencia: Si
- 61** Eduardo Martín. Brown Dwarfs (IAU Symposium 211). *Brown Dwarfs (IAU Symposium 211)*. pp. 1 - 561. San Francisco(Estados Unidos de América): Astronomical Society of the Pacific, 10/08/2003. ISBN 158381132X
Tipo de producción: Libro o monografía científica
Posición de firma: 1
Nº total de autores: 1
Resultados relevantes: Es el libro del Simposio de la Unión Astronómica Internacional celebrado en Hawaii en Mayo del 2002. Fue el primero, y hasta hora el último íntegramente dedicado a las enanas marrones. Contiene más de 100 artículos organizados en 11 secciones.
Publicación relevante: Si
Tipo de soporte: Libro
Grado de contribución: Editor/a o coeditor/a
Autor de correspondencia: Si
- 62** Manuel Vázquez Abeledo; Eduardo Martín Guerrero de Escalante. La Búsqueda de Vida Extraterrestre. *La Búsqueda de Vida Extraterrestre*. pp. 1 - 424. Madrid(España): Mc-Graw Hill Interamericana de España, 13/10/2006. ISBN 9788448155612
Tipo de producción: Libro de divulgación
Posición de firma: 2
Nº total de autores: 1
Resultados relevantes: La existencia de vida fuera de la Tierra ha sido un tema de interés para el ser humano desde sus orígenes. En la actualidad nos podemos plantear su búsqueda. Naves espaciales recorren el Sistema Solar la investigación astronómica nos permite conocer cada día mejor la evolución del universo y la biología terrestre nos amplía los límites de la vida. En esta obra se plantean los condicionamientos físicos de la vida tanto a un nivel elemental como de inteligencia. Se pasa revista a los más importantes descubrimientos debates y proyectos (vida fósil en marte océanos bajo la capa de hielo del satélite Europa, enanas marrones y planetas extrasolares búsqueda de señales extraterrestres inteligentes)
Tipo de soporte: Libro
Grado de contribución: Autor/a o coautor/a de libro completo
Autor de correspondencia: No
- 63** Antonio Lazcano; Eduardo Martín; Thorsten Thorsteinsson. *Bioastronomy 2004*. *Astrobiology*. 5 - 5, pp. 575 - 575. Mary Ann Liebert Inc. publishers, 01/10/2005.
Tipo de producción: Reseña
Posición de firma: 2
Nº total de autores: 3
Resultados relevantes: Reseña del congreso *Bioastronomy 2004: Habitable Worlds*, celebrado en Reykjavik, Islandia, entre el 12 y el 16 de julio del 2004, auspiciado por el NASA Astrobiology Institute.
Tipo de soporte: Revista
Grado de contribución: Autor/a o coautor/a de nota crítica o reseña publicada
Autor de correspondencia: No



Trabajos presentados en congresos nacionales o internacionales

- 1** **Título del trabajo:** Searching for biomarkers in the atmospheric habitable zones of Y dwarfs
Nombre del congreso: Habitable Worlds
Tipo evento: Congreso **Ámbito geográfico:** Internacional no UE
Tipo de participación: Participativo - Ponencia oral (comunicación oral)
Autor de correspondencia: Si
Fecha de celebración: 22/02/2021
Fecha de finalización: 26/02/2021
Entidad organizadora: American Astronomical Society
Ciudad entidad organizadora: Madison, Estados Unidos de América
Con comité de admisión ext.: Si
Forma de contribución: Informe científico-técnico
Eduardo Martín.
- 2** **Título del trabajo:** Ultracool Legacy Science with the Euclid Space Mission
Nombre del congreso: Online Summit on Astrophysics and Space Research
Tipo evento: Congreso **Ámbito geográfico:** Internacional no UE
Tipo de participación: Participativo - Ponencia invitada/ Keynote **Intervención por:** Por invitación
Autor de correspondencia: Si
Ciudad de celebración: Lisboa, Lisboa, Portugal
Fecha de celebración: 12/11/2020
Fecha de finalización: 13/11/2020
Entidad organizadora: STEMIO **Tipo de entidad:** Plataforma profesional
Ciudad entidad organizadora: Singapur, Singapur
Con comité de admisión ext.: Si
Forma de contribución: Artículo de divulgación
Eduardo Martín. "Ultracool Legacy Science with the Euclid Space Mission". 12/11/2020.
- 3** **Título del trabajo:** Searching for biomarkers in Y dwarfs
Nombre del congreso: Congreso Internacional de Astrobiología Virtual
Tipo evento: Congreso **Ámbito geográfico:** Internacional no UE
Tipo de participación: Participativo - Ponencia oral (comunicación oral)
Autor de correspondencia: Si
Ciudad de celebración: Bogotá, Colombia
Fecha de celebración: 11/11/2020
Fecha de finalización: 13/11/2020
Entidad organizadora: Instituto de Astrobiología de Colombia **Tipo de entidad:** Centros de Innovación y Tecnología
Ciudad entidad organizadora: Bogotá, Colombia
Con comité de admisión ext.: Si
Forma de contribución: Artículo científico
Eduardo Martín; Juan Villafaña. "Searching for biomarkers in Y dwarfs".
- 4** **Título del trabajo:** Acerca de la diversidad de los mundos habitables y su probabilidad de estar habitados
Nombre del congreso: Impulsando la Astrofísica en España: 50 años de tesis doctorales en el IAC
Tipo evento: Congreso **Ámbito geográfico:** Nacional
Intervención por: Por invitación



Tipo de participación: Participativo - Ponencia invitada/ Keynote

Autor de correspondencia: Si

Ciudad de celebración: San Cristóbal de La Laguna, Canarias, España

Fecha de celebración: 17/07/2019

Fecha de finalización: 19/07/2019

Entidad organizadora: Instituto de Astrofísica de Canarias

Tipo de entidad: Organismo Público de Investigación

Ciudad entidad organizadora: San Cristóbal de La Laguna, Canarias, España
Eduardo Martín.

5 Título del trabajo: Titus-Bode Laws in Planetary Systems - A Synergistic View. 11th Rencontres du Vietnam

Nombre del congreso: Planetary Systems: A Synergistic View

Tipo evento: Congreso

Ámbito geográfico: Internacional no UE

Tipo de participación: Participativo - Ponencia invitada/ Keynote

Intervención por: Por invitación

Autor de correspondencia: Si

Ciudad de celebración: Quoy Nhon, Vietnam

Fecha de celebración: 20/07/2015

Fecha de finalización: 24/07/2015

Entidad organizadora: International Center of Interdisciplinary Science Education

Tipo de entidad: Fundación

Ciudad entidad organizadora: Quoy Nhon, Vietnam

Publicación en acta congreso: Si

Eduardo Martín. "Titus-Bode Laws in Planetary Systems - A Synergistic View".

6 Título del trabajo: High precision radial velocities in the near-infrared domain

Nombre del congreso: Research, Science and Technology of Brown Dwarfs and Exoplanets

Tipo evento: Congreso

Ámbito geográfico: Internacional no UE

Tipo de participación: Participativo - Plenaria

Intervención por: Por invitación

Autor de correspondencia: Si

Ciudad de celebración: Shangai, China

Fecha de celebración: 19/07/2009

Fecha de finalización: 25/07/2009

Entidad organizadora: Observatorio de Shangai

Tipo de entidad: Centros de Innovación y Tecnología

Ciudad entidad organizadora: Shangai, China

Publicación en acta congreso: Si

Forma de contribución: Artículo científico

Eduardo Martín; Eike Guenther; Carlos del Burgo; Maria Rosa Zapatero Osorio; Rohit Deshpande; Florian Rodler; Víctor Sánchez Béjar; Pedro Esparza; Luisa Valdivielso; André Moitinho; Antonio Amorim; Jorge Lima; Antonio Fiorenzano; Antonio Magazzù; Ramarao Tata. "Research, Science and Technology of Brown Dwarfs and Exoplanets". 16, pp. 02001-p1 - 02001-p7. EDP sciences, 01/09/2011. ISBN 978-2-7598-0664-5

7 Título del trabajo: Lithium Abundances as a Probe of the Early Evolution of Solar-type Stars

Nombre del congreso: Third International Symposium on Bioastronomy

Tipo evento: Congreso

Ámbito geográfico: Internacional no UE

Tipo de participación: Participativo - Ponencia oral (comunicación oral)

Intervención por: Revisión previa a la aceptación

Autor de correspondencia: Si

Ciudad de celebración: Val Cenis, Francia



Fecha de celebración: 18/06/1990

Fecha de finalización: 23/06/1990

Entidad organizadora: International Astronomical Union

Tipo de entidad: Asociaciones y Agrupaciones

Ciudad entidad organizadora: Paris, Francia

Con comité de admisión ext.: Si

Forma de contribución: Informe científico-técnico

Eduardo Martín; Gibor Basri; Claude Bertout. "Bioastronomy The Search for Extraterrestrial Life — The Exploration Broadens". En: Lecture Notes in Physics. 390, pp. 63 - 63. 08/03/1991.

Fuente de citas: ADS

Citas: 2

Gestión de I+D+i y participación en comités científicos

Comités científicos, técnicos y/o asesores

- Título del comité:** European Southern Observatory Observing Programmes Committee
Ámbito geográfico: Unión Europea
Entidad de afiliación: European Southern Observatory
Tipo de entidad: Centros de Innovación y Tecnología
Ciudad entidad afiliación: Garching bei München, Alemania
Fecha de inicio-fin: 01/02/2015 - 31/05/2017
- Título del comité:** Scientific Organizing Committee 31st International Colloquium Institut d'Astrophysique de Paris
Ámbito geográfico: Internacional no UE
Entidad de afiliación: Institut d'Astrophysique de Paris
Tipo de entidad: Centros de Innovación y Tecnología
Ciudad entidad afiliación: Paris, Île de France, Francia
Fecha de inicio-fin: 02/02/2015 - 31/07/2015
- Título del comité:** Comité científico Congreso Internacional "Research, Science and Technology of Brown Dwarfs and Exoplanets"
Ámbito geográfico: Internacional no UE
Ciudad de radicación: Shangai, China
Entidad de afiliación: Observatorio de Shangai
Ciudad entidad afiliación: Shangai, China
Fecha de inicio-fin: 28/11/2008 - 01/12/2011
- Título del comité:** Comité Científico 8th Internacional Conference Bioastronomy - Habitable Worlds
Entidad de afiliación: University of Iceland
Tipo de entidad: Universidad
Ciudad entidad afiliación: Reykjavik, Islandia
Fecha de inicio-fin: 03/02/2004 - 01/02/2005
- Título del comité:** Comité científico Simposio IAU 211
Ámbito geográfico: Internacional no UE
Entidad de afiliación: Institute for Astronomy of the University of Hawaii
Ciudad entidad afiliación: Honolulu, Estados Unidos de América
Fecha de inicio-fin: 01/05/2001 - 10/08/2003



- 6 Título del comité:** SEA cero CO2
Ámbito geográfico: Nacional
Entidad de afiliación: Sociedad Española de Astronomía
Tipo de entidad: Asociaciones y Agrupaciones
Ciudad entidad afiliación: Barcelona, Cataluña, España
Fecha de inicio: 01/10/2019
- 7 Título del comité:** Euclid Science Team
Ámbito geográfico: Unión Europea
Entidad de afiliación: European Space Agency
Tipo de entidad: Centros de Innovación y Tecnología
Ciudad entidad afiliación: Noordwijk, Holanda
Fecha de inicio: 01/09/2012

Organización de actividades de I+D+i

Título de la actividad: Splinter session on ultracool dwarfs
Tipo de actividad: Reunión anual del consorcio Euclid
Ámbito geográfico: Unión Europea
Ciudad de celebración: Sitges, Cataluña, España
Entidad convocante: ICE-CSIC
Ciudad entidad convocante: Barcelona, Cataluña, España
Modo de participación: Organizador
Nº de asistentes: 24
Fecha de inicio-fin: 04/05/2020 - 08/05/2020
Duración: 5 días

Gestión de I+D+i

- 1 Nombre de la actividad:** CARMENES Science Team
Tipología de la gestión: Gestión de programa de investigación
Funciones desempeñadas: Representante de centro
Ciudad entidad realización: Andalucía, España
Entidad de realización: Observatorio de Calar Alto
Fecha de inicio: 01/01/2014
Duración: 3 años - 3 meses
Sistema de acceso: Por designación de quien corresponda sin concurrencia
Promedio presupuesto anual: 600.000
Nº de personas: 16
Perfil grupo receptor: Agencias de selección de personal investigador o técnico o gestor de I+D+i
Ámbito geográfico: Unión Europea
Tareas concretas: Representante de centro
- 2 Nombre de la actividad:** Proyecto estratégico
Tipología de la gestión: Gestión de grupo de investigación
Funciones desempeñadas: Coordinador
Entidad de realización: Instituto de Astrofísica de Canarias
Tipo de entidad: Organismo Público de Investigación
Fecha de inicio: 01/01/2007
Duración: 2 años - 6 meses



Otros méritos

Estancias en centros de I+D+i públicos o privados

- 1** **Entidad de realización:** Laboratoire d'Astrophysique de l'Université de Grenoble **Tipo de entidad:** Centros de Innovación y Tecnología
Ciudad entidad realización: Grenoble, Rhône-Alpes, Francia
Fecha de inicio-fin: 15/09/2017 - 15/12/2017 **Duración:** 3 meses
Objetivos de la estancia: Invitado/a
Tareas contrastables: docencia e investigación
- 2** **Entidad de realización:** Universidad de California en San Diego **Tipo de entidad:** Universidad
Facultad, instituto, centro: Ciencias Físicas
Ciudad entidad realización: San Diego, Estados Unidos de América
Fecha de inicio-fin: 02/05/2016 - 02/12/2016 **Duración:** 6 meses
Entidad financiadora: MINISTERIO DE EDUCACION Y CIENCIA
Ciudad entidad financiadora: Madrid, Comunidad de Madrid, España
Nombre del programa: Salvador de Madariaga
Objetivos de la estancia: Invitado/a
Tareas contrastables: Docencia e investigación
Resultados relevantes: Simulaciones numéricas de las capacidades de la misión espacial Euclid para el descubrimiento y caracterización de enanas ultrafrías