



Verónica Fernández Mármol

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Summary of CV

This section describes briefly a summary of your career in science, academic and research; the main scientific and technological achievements and goals in your line of research in the medium -and long- term. It also includes other important aspects or peculiarities.

In 2004, Veronica and her colleagues team at Heriot-Watt Univ (UK) and British Telecom Laboratories, achieved the highest reported secure key rate at the time for a quantum communication system. They also extended this approach to telecommunication passive optical networks in one of the first experimental studies on multi-user QKD implementations at GHz speed. These were all very relevant results at that time since QKD was limited to very few bits/s and we enhanced this rate to Mbits/s bring the technology closer to the demanding high bandwidths of the final users.

In 2009, Veronica started a new experimental line in free-space QKD, which was the first line of quantum communication technologies at CSIC.

In 2013, she and her team achieved a free-space urban quantum communication with the highest reported QKD key rate at that time —which crossed CSIC campus in Madrid city centre.

The scientific activity mentioned above were published mostly in Q1/Q2 journals and has been the first or last author in more than 90% of her publications since 2009. She has published more than 30 scientific articles, with a total number of citations of 1544 (Google Scholar) and an average number of authors of 4. She has been awarded with three sexenios de investigación.

She has lead the creation of a specialized lab of quantum communication technologies at CSIC, hub that hosts several collaborative tasks with the University of Vigo, UPM, INDRA, Airbus, IAC, and IMB-CNM.

She has contributed with oral presentations in many international conferences, and has been invited 4 times to international conferences in the field.

She has one book chapter in Springer International Publishing and has been referee for Scientific Reports, Optics Express, European project evaluator, and member of the program committee of the prestigious international conference in quantum cryptography QCRYPT.

She has also a very active public profile with participations in well-known popular events such as TEDx talk, and others to promote gender equality in STEM such as profesiones de chico, Ellas son el CSIC, STEM girls, etc.

She won the best thesis prize of the School of Engineering and Physical Sciences of Heriot-Watt University in 2006 and the Thales Scottish Technology prize in 2008, awarded to outstanding technological scientific thesis and open to all Scottish universities.

Regarding leadership and independence, in the last 5 years, Veronica has participated in 7 main competitive projects: three European and four national, and has been the IP of CSIC in 6 of them. She has achieved more than 7 M€ in funding in this period. She and her team are the authors of three patents, and two registered softwares, one in collaboration with aerospace companies Thales Alenia Space, Hispasat, and public institutions: Institute of Astrophysics of the Canary Islands and University of Vigo. She has founded a spinoff in quantum communication technologies, Q-Dynamics.

She has directed 4 PhD thesis, 6 Master projects, and one of MEng project.



Regarding mobility and internationalization, Veronica has an international profile from her PhD which took place entirely in the UK, in Heriot-Watt University, Edinburgh, and through two postdoctoral research stays: one at LMU Univ., Munich, at one of the top groups in quantum communications, lead by Prof. Weinfurter's group, and a 2-month stay in QinetiQ defence and research company, a top company in defence-related research. Collaboration with the previous groups is currently ongoing through the preparation of two QUANTERA proposals.

Veronica is currently participating in three international projects: Caramuel, from ARTES ESA program; QuBIP, from Horizon Europe Increased Cybersecurity; and EuroQCI-SPAIN from Digital Europe Program of the European Commission.

Veronica is the Spanish representative of the "Joint Board on Communication Satellite Programmes Scylight Optical communication advisory committee", of the European Space Agency, and one of the coordinators of CSIC's interdisciplinary Quantum Technologies Platform, with 23 research groups at CSIC.

She collaborates with the group Space Communications Laboratory, at the National Institute of Information and Communications Technology, Japan.

She co-organized in 2021 ICE Industrial Day, with the participation of top international experts in the field of quantum communications and the presence of the Secretary of Innovation.

She also participated in a roundabout table organized by Quebec government delegation in Brussels to elaborate a roadmap to international collaboration between Canada and Europe.



General quality indicators of scientific research

This section describes briefly the main quality indicators of scientific production (periods of research activity, experience in supervising doctoral theses, total citations, articles in journals of the first quartile, H index...). It also includes other important aspects or peculiarities.

The research activity has been awarded with three Sexenios de Investigación, according to the Spanish evaluating organisms (CNEAI) research excellence criteria. The sum of all the citations of the published journals is 1534 (GS), with an h-Index of 16 (GS). She has participated in more than 21 research projects (6 as the IP), more than 30 peer-reviewed articles (one of them a book chapter), author of 3 patents and founding partner of the spinoff Q-Dynamics. Verónica Fernández is one of the two coordinators of CSIC's PTI+ Quantum Technologies Platform (QTEP), and CSIC's coordinator of the National Complementary Plan of quantum technologies. She has directed two PhD thesis (plus two currently ongoing), six Master thesis and one undergraduate thesis.

She is also member of the "Joint Board on Communication Satellite Programmes (JCB) Scylight Optical communication advisory committee", which is the advisory body for matters related to activities carried out under the Strategic Programme Line "Optical Communication – ScyLight" of ESA. This program addresses the development, demonstration and utilization of innovative optical communication technologies for satellite communication, including quantum technologies. One of her tasks as a Spanish point of contact included in the ESA's mandate, is to advise on the ScyLight Optical Roadmap, including the definition of proposed actions (work plans, projects and other initiatives) to recommend additional (complementary) actions for consideration. She also is one of the Spanish representatives of the Global Forum on Technology of the Organization for Economic Cooperation and Development (OCDE), and member of the EuroQCI Thematic Working Groups. She is also member of the executive committee of the Foundation Circle for Defence and Security.



Verónica Fernández Mármol

Surname(s): **Fernández Mármol**
Name: **Verónica**
ORCID: **0000-0001-9720-3055**
ScopusID: **56880471300**
Contact aut. region/reg.: **Community of Madrid**
Email: **veronica.fernandez@csic.es**
Personal web page: **<http://www.itefi.csic.es/es/departamentos/dtic>**

Current professional situation

Employing entity: Consejo Superior de Investigaciones Científicas. C.S.I.C. **Type of entity:** State agency
Department: Instituto de Tecnologías Físicas y de la Información "Leonardo Torres Quevedo"
Professional category: Científica titular
City employing entity: Madrid, Community of Madrid, Spain
Email: veronica.fernandez@iec.csic.es

Start date: 18/09/2009

Type of contract: Civil servant

Dedication regime: Full time

Primary (UNESCO code): 220301 - Circuits; 220308 - Photoelectricity; 220905 - Fibra optics; 220906 - Geometric optics; 220910 - Lasers; 330707 - Laser devices; 332500 - Telecommunications technology

Identify key words: Physics - Optical physics; Physics - Quantum physics; Electronic technology and of the communications

Previous positions and activities

	Employing entity	Professional category	Start date
1	Instituto Física Aplicada, CSIC	Doctor Contratado Jae Doc	11/2008
2	Instituto Física Aplicada, CSIC	Doctor Contratado Juan de la Cierva	11/2007
3	Universidad Heriot-Watt, Edimburgo (Reino Unido)	Doctor Contratado	09/2006
4	Universidad Heriot-Watt, Edimburgo, (Reino Unido)	Contratado predoctoral	02/12/2002
5	Instituto Física Aplicada, CSI	Científica Titular	10/2009

1 **Employing entity:** Instituto Física Aplicada, CSIC **Type of entity:** Public Research Body
Professional category: Doctor Contratado Jae Doc
Start-End date: 11/2008 - 09/2009 **Duration:** 11 months

2 **Employing entity:** Instituto Física Aplicada, CSIC **Type of entity:** Public Research Body
Department: Tratamiento de la Información y Criptografía, Instituto Física Aplicada, CSIC
City employing entity: Madrid, Community of Madrid, Spain



Professional category: Doctor Contratado Juan de la Cierva
Start-End date: 11/2007 - 11/2008 **Duration:** 12 months

3 **Employing entity:** Universidad Heriot-Watt, Edimburgo (Reino Unido)
Department: Universidad Heriot-Watt
City employing entity: Edimburgo, United Kingdom
Professional category: Doctor Contratado
Start-End date: 09/2006 - 09/2007 **Duration:** 17 months

4 **Employing entity:** Universidad Heriot-Watt, Edimburgo, (Reino Unido)
Professional category: Contratado predoctoral
Start-End date: 02/12/2002 - 01/04/2006

5 **Employing entity:** Instituto Física Aplicada, CSI
Department: Tratamiento de la Información y de las Comunicaciones, Instituto Física Aplicada, CSI
City employing entity: Madrid, Community of Madrid, Spain
Professional category: Científica Titular
Start date: 10/2009
Type of contract: Civil servant
Area of leadership and/or management activity: Public Research Body



Education

University education

1st and 2nd cycle studies and pre-Bologna degrees

University degree: Higher degree

Name of qualification: Licenciatura en Ciencias Físicas Especialidad: Física Electrónica

Degree awarding entity: Universidad de Sevilla

Date of qualification: 06/2002

Doctorates

Doctorate programme: Doctor en Ciencias Físicas

Degree awarding entity: Universidad Heriot-Watt

City degree awarding entity: Edimburgo, United Kingdom

Date of degree: 05/2006

European doctorate: Yes

Date of award: 05/2006

Language skills

Language	Listening skills	Reading skills	Spoken interaction	Speaking skills	Writing skills
French	B2	B2	B2	B2	B2
English	C2	C2	C2	C2	C2

Teaching experience

General teaching experience

Type of teaching: Official teaching

Name of the course: Quantum Cryptography, Introduction to Implementation of quantum technologies, Laboratory of quantum technologies

Type of programme: Master's degree

Type of teaching: Virtual

University degree: Master's Degree in Quantum Technologies

Course given: quantum cryptography, Implementation of quantum technologies, Laboratory

Frequency of the activity: 3

Start date: 01/10/2023

Type of hours/ ECTS credits: Credits

Hours/ECTS credits: 1

Entity: International University of Menendez Pelayo

Type of entity: University

Faculty, institute or centre: ITEFI, CSIC



City of entity: Spain

Subject language: English

Experience supervising doctoral thesis and/or final year projects

- 1** **Project title:** Sistemas de distribución cuántica de claves seguros y robustos en canales de transmisión aérea
Type of project: Doctoral thesis
Entity: Universidad Complutense de Madrid **Type of entity:** University
City of entity: Madrid, Community of Madrid, Spain
Student: Pablo Arteaga-Díaz
Obtained qualification: Sobresaliente Cum Laude
Date of reading: 13/09/2024
- 2** **Project title:** Caracterización temporal y de la polarización de un sistema de distribución cuántica de clave
Type of project: Trabajo fin de máster
Entity: Universidad Complutense de Madrid **Type of entity:** University
Student: Alejandro Vicente García
Date of reading: 17/06/2022
- 3** **Project title:** Practical free-space quantum key distribution system for metropolitan links Jose
Type of project: Trabajo fin de máster
Entity: Universidad Politécnica de Madrid **Type of entity:** University
City of entity: Spain
Student: Jose Manuel Bustarviejo
Obtained qualification: 7.5
Date of reading: 19/11/2021
- 4** **Project title:** Diseño e Implementación de Sistemas de Distribución Cuántica de Clave en Canales Aéreos.
Type of project: End of course project
Co-director of thesis: Verónica Fernández Mármol
Entity: Escuela Técnica Superior de Ingenieros de Telecomunicación. Universidad Politécnica de Madrid **Type of entity:** University
City of entity: Madrid, Community of Madrid, Spain
Student: Javier Palomares Torrecilla
Obtained qualification: Sobresaliente
Date of reading: 29/10/2020
- 5** **Project title:** Contribuciones al Desarrollo de Sistemas de Distribución Cuántica de Claves
Type of project: Proyecto Fin de Master
Co-director of thesis: Verónica Fernández Mármol
Entity: Universidad Complutense de Madrid **Type of entity:** University
City of entity: Madrid, Community of Madrid, Spain
Student: Pablo Arteaga Díaz
Obtained qualification: Sobresaliente (A+)
Date of reading: 20/09/2019
Date of award: 20/09/2019
- 6** **Project title:** Seguimiento Automático de Polarización para Comunicaciones Cuánticas Aéreas entre Plataformas Móviles
Type of project: Proyecto Fin de Master



Co-director of thesis: Verónica Fernández Mármol
Entity: Universidad Carlos III de Madrid
City of entity: Madrid, Community of Madrid, Spain
Student: Miguel Machín de León
Obtained qualification: Sobresaliente (A+)
Date of reading: 19/09/2019
Date of award: 19/09/2019

Type of entity: University

7 Project title: Contrato de Garantía Juvenil

Type of project: Contrato de Garantía Juvenil Referencia: PEJD-2018-PRE/TIC-8174

Co-director of thesis: Verónica Fernández Mármol

Entity: Instituto de Tecnologías Físicas "Leonardo Torres Quevedo" del CSIC

Type of entity: State agency

City of entity: Madrid, Community of Madrid, Spain

Student: Magín Parra Serrano

Date of reading: 31/03/2020

Date of recognition: 31/03/2020

Date of award: 01/04/2019

8 Project title: Sistema de estabilización de haz para la corrección de efectos atmosféricos de "beam wander" para comunicaciones cuánticas en espacio libre a alta velocidad

Type of project: Trabajo fin de Master

Entity: Universidad Complutense de Madrid

Type of entity: University

City of entity: Madrid, Community of Madrid, Spain

Student: Alejandro Ocampos Guillén

Obtained qualification: Sobresaliente

Date of reading: 22/09/2017

9 Project title: Sistema de estabilización de haz con doble espejo sintonizable para la corrección de turbulencias atmosféricas

Type of project: Trabajo fin de Master

Entity: Universidad Complutense de Madrid

Type of entity: University

City of entity: Madrid, Community of Madrid, Spain

Student: Miguel Ángel Báez Chorro

Obtained qualification: Sobresaliente

Date of reading: 09/2016

10 Project title: Comparison of beam wander correction by quadrant and ideal detectors for aerial quantum communication links

Type of project: Trabajo fin de Master

Entity: Universitat Politècnica de Catalunya

Type of entity: University

City of entity: Madrid, Community of Madrid, Spain

Student: Jorge Gómez García

Obtained qualification: Sobresaliente

Date of reading: 09/2015

11 Project title: Contribuciones a las Comunicaciones Ópticas en Espacio Libre: Utilización de Telescopios Cherenkov como Receptores y Corrección de Beam Wander en Comunicaciones Cuánticas

Type of project: Doctoral thesis

Entity: Universidad Carlos III de Madrid

Type of entity: University

City of entity: Madrid, Community of Madrid, Spain



Student: Alberto Carrasco Casado
Obtained qualification: Sobresaliente Cum Laude
Date of reading: 11/06/2015

- 12** **Project title:** Estudio y desarrollo experimental de un sistema de distribución cuántica de clave a través del espacio libre
Type of project: Doctoral thesis
Entity: Universidad Autónoma de Madrid **Type of entity:** University
City of entity: Madrid, Community of Madrid, Spain
Student: María José García Martínez
Obtained qualification: Apta Cum Lasude
Date of reading: 21/06/2013

Student tutorials

Name of the programme: Prácticas extracurriculares
Entity: Centro de Tecnologías Físicas Leonardo Torres Quevedo **Type of entity:** State agency
City of entity: madrid, Community of Madrid, Spain
Number of recognized hours/ECTS credits: 500
Number of tutored students: 2

Courses and seminars given

- 1** **Type of event:** Seminar
Name of the event: CRIPTOGRAFÍA CUÁNTICA
Organising entity: Academia de Ingenieros del Ejército de Tierra
Hours of teaching: 1
Teaching date: 25/11/2022
- 2** **Type of event:** Seminar
Name of the event: Comunicación Cuántica para aplicaciones terrestres y espaciales
Organising entity: Universidad Isabel I **Type of entity:** University
Hours of teaching: 1
Teaching date: 24/11/2022
- 3** **Type of event:** Seminar
Name of the event: Quantum cryptography for data protection in the era of quantum computer
Organising entity: Universidad Politécnica de Madrid **Type of entity:** University
Hours of teaching: 1,5
Teaching date: 10/02/2022
- 4** **Type of event:** Seminar
Name of the event: Nuevos Paradigmas en Ciberseguridad: Criptografía Cuántica
Organising entity: ACADEMIA DE INGENIEROS DEL Ejército de Tierra
Hours of teaching: 1
Teaching date: 23/11/2021



- 5** **Type of event:** Seminar
Name of the event: Quantum Communication. From Theory to Practice
Organising entity: Universidad Carlos III de Madrid **Type of entity:** University
Hours of teaching: 1,5
Teaching date: 05/02/2021
- 6** **Type of event:** Seminar
Name of the event: Máster Universitario en Ingeniería de Sistemas Electrónicos y Aplicaciones.
City organizing entity: Madrid, Community of Madrid, Spain
Organising entity: Universidad CarlosIII
Teaching date: 22/03/2020
Type of participation: Participatory - oral communication
Corresponding author: Yes
- 7** **Type of event:** Seminar
Name of the event: Ciberamenazas del siglo XXI:el Ordenador Cuántico frente a la Criptografía Cuántica
City organizing entity: Madrid, Community of Madrid, Spain
Organising entity: IES GRAN CAPITÁN
Teaching date: 12/02/2020
Type of participation: Participatory - oral communication
Corresponding author: Yes
- 8** **Type of event:** Dentro del Máster "Nuevas Tecnologías Electrónicas y Fotónicas"
Name of the event: Tutoría de Prácticas de Empresa.
City organizing entity: Madrid, Community of Madrid, Spain
Organising entity: Facultad de Ciencias Físicas. **Type of entity:** University
Universidad Complutense de Madrid
Hours of teaching: 150 **Teaching language:** Spanish
Teaching date: 30/01/2020
Type of participation: Tutoría de Prácticas.
Corresponding author: Yes
- 9** **Type of event:** Seminar
Name of the event: Introduction to the principles of quantum cryptography. Recent experimental progress and current opportunities." impartido dentro de la Summer School on Quantum Technologies
City organizing entity: Santander, Cantabria, Spain
Organising entity: Universidad Internacional Menendez **Type of entity:** University
Pelayo
Teaching date: 21/06/2019
Type of participation: Participatory - oral communication
Corresponding author: Yes
- 10** **Type of event:** Seminar
Name of the event: Máster Universitario en Ingeniería de Sistemas Electrónicos y Aplicaciones . Systems for quantum key distribution in free space
City organizing entity: Madrid, Community of Madrid, Spain
Organising entity: Escuela de Ingenieros de **Type of entity:** University
Telecomunicación Universidad CarlosIII
Teaching date: 22/03/2019
Type of participation: Participatory - oral communication
Corresponding author: Yes



- 11** **Type of event:** Seminar
Name of the event: Computación y Criptografía Cuánticas (dentro del MASTER en Ciencia y Tecnología Informática)
City organizing entity: Madrid, Community of Madrid, Spain
Organising entity: Departamento de Informática, Universidad Carlos III
Hours of teaching: 1,3
Teaching date: 05/03/2019
Type of entity: University
Teaching language: Spanish
- 12** **Type of event:** Seminar
Name of the event: Cómo protegernos del ordenador cuántico. Amenazas a la ciberseguridad del siglo XXI. (dentro del MASTER Nuevas Tecnologías Electrónicas y Fotónicas)
City organizing entity: Madrid, Community of Madrid, Spain
Organising entity: Facultad de Físicas, Universidad Complutense de Madrid
Hours of teaching: 1
Teaching date: 14/12/2017
Type of entity: University
Teaching language: Spanish
- 13** **Type of event:** Seminar
Name of the event: Computación y Criptografía Cuánticas (dentro del MASTER en Ciencia y Tecnología Informática)
City organizing entity: Madrid, Community of Madrid, Spain
Organising entity: Departamento de Informática, Universidad Carlos III
Hours of teaching: 1,3
Teaching date: 04/04/2017
Type of entity: University
Teaching language: Spanish
- 14** **Type of event:** Seminar
Name of the event: Computación y Criptografía Cuánticas (dentro del MASTER en Ciencia y Tecnología Informática)
City organizing entity: Madrid, Community of Madrid, Spain
Organising entity: Departamento de Informática, Universidad Carlos III
Hours of teaching: 1,3
Teaching date: 15/03/2016
Type of entity: University
Teaching language: Spanish
- 15** **Type of event:** Seminar
Name of the event: Compensating turbulent effects for efficient free space quantum communication
City organizing entity: Madrid, Community of Madrid, Spain
Organising entity: Instituto de Física Fundamental (CSIC)
Hours of teaching: 1
Teaching date: 20/11/2015
Type of entity: University
Teaching language: English
- 16** **Type of event:** Seminar
Name of the event: Quantum cryptography against quantum computers: the battle for global security (Actividad de Formación Continua del Programa Oficial de Posgrado en Ingeniería Informática y de Telecomunicación)
City organizing entity: Madrid, Community of Madrid, Spain
Organising entity: Universidad Autónoma de Madrid
Hours of teaching: 1
Teaching date: 13/03/2014
Type of entity: University



- 17** **Type of event:** Seminar
Name of the event: ¿Podemos proteger la información ante el todopoderoso ordenador cuántico?
City organizing entity: Madrid, Community of Madrid, Spain
Organising entity: Universidad Complutense de Madrid
Hours of teaching: 1,3
Teaching date: 20/01/2014
- 18** **Type of event:** Seminar
Name of the event: Ciclo UPM TEMAS AVANZADOS EN SEGURIDAD Y SOCIEDAD DE LA INFORMACIÓN (Cómo los ordenadores cuánticos aniquilarían la Criptografía actual)
City organizing entity: Madrid, Community of Madrid, Spain
Organising entity: Universidad Politécnica de Madrid **Type of entity:** University (Escuela Universitaria de Ingeniería Técnica de Telecomunicación)
Hours of teaching: 1 **Teaching language:** Spanish
Teaching date: 09/05/2012
- 19** **Name of the event:** Seminario “Experimental Quantum Cryptography: Review and future outlook”
City organizing entity: Madrid, Community of Madrid, Spain
Organising entity: C-IV, Universidad Autónoma de Madrid. Departamento de Física de Materiales
Hours of teaching: 2
Teaching date: 05/04/2011
- 20** **Name of the event:** Conferencias FIST. Criptografía cuántica
City organizing entity: Madrid, Community of Madrid, Spain
Teaching date: 27/03/2008
Type of participation: Participatory - oral communication

Plurality, interdisciplinarity and teaching complexity

I teach in the Master's in Quantum Technologies (1 credit of these courses: Quantum Cryptography, Introduction to Implementation of Quantum Technologies, and Laboratory of Quantum Technologies), created by CSIC and the International Menéndez Pelayo University, with the collaboration of numerous faculty members from various universities (60 ECTS in total).

The master's program is financially supported by the CSIC Quantum Technologies Platform, the Spanish Quantum Technologies Network, and the Quantum Spain project.

I have also directed three PhD thesis, plus one ongoing and directed 6 Master Thesis projects.

Scientific and technological experience

Scientific or technological activities

R&D projects funded through competitive calls of public or private entities

- 1 Name of the project:** Spanish Quantum Alice, SPAQUA .

Type of project: Demonstration, pilot projects, conceptual formulations and design of processes and services

Geographical area: National

Degree of contribution: Researcher

Entity where project took place: Instituto de Tecnologías Físicas y de la Información ITEFI. CSIC

Type of entity: Public Research Body

City of entity: Madrid, Community of Madrid, Spain

Name principal investigator (PI, Co-PI....): Verónica Fernández Mármol; Pablo Arteaga Díaz

Funding entity or bodies:
Funded by the AEI

Type of participation: Principal investigator

Name of the programme: Colaboración público privada

Code according to the funding entity: CPP2023-010731

Start-End date: 01/01/2025 - 31/05/2027 **Duration:** 3 years

Participating entity/entities: Airbus España

Total amount: 377.000 €

Relevant results: La solución propuesta consiste en la especificación, diseño, fabricación y prueba de un prototipo elegante para la generación de pulsos ópticos y la electrónica destinada a la codificación de los estados cuánticos en un transmisor QKD para aplicaciones satelitales.
- 2 Name of the project:** EuroQCI Spain.

Geographical area: European Union

Degree of contribution: Researcher

Entity where project took place: European Commission.

Name principal investigator (PI, Co-PI....): Verónica Fernández Mármol

Funding entity or bodies:
European Commission.

Type of participation: Investigador Principal del C.S.I.C.

Name of the programme: DIGITAL-2021-QCI-01-DEPLOY-NATIONAL

Code according to the funding entity: 1011091638

Start-End date: 01/01/2023 - 31/07/2025

Participating entity/entities: Cellnex; Consejo Superior de Investigaciones Científicas; ICFO (coordinator); Indra; TecnoBIT; Telefónica I+D; Universidad Politécnica de Madrid

Total amount: 5.000.000 €
- 3 Name of the project:** QUAntum-based Resistant Architectures and Techniques. Integration QKD+PQC (QURSA).

Geographical area: National

Degree of contribution: Researcher



Entity where project took place: Instituto de Tecnologías Físicas y de la Información (ITEFI) del CSIC.

Type of entity: Public Research Body

City of entity: Madrid, Community of Madrid, Spain

Name principal investigator (PI, Co-PI....): Verónica Fernández Marmól; Luis Hernández Encinas

Nº of researchers: 10

Nª people/year: 10

Funding entity or bodies:

MICIIN, Convocatoria 2021 de Proyectos Orientados a la Transición Ecológica y a la Transición Digital, del Plan Estatal de Investigación Científica, Técnica y de Innovación 2021- 2023, en el Marco del

Type of entity: Ministerio

City funding entity: Madrid, Community of Madrid, Spain

Type of participation: Principal investigator

Name of the programme: Proyectos Orientados a la Transición Ecológica y a la Transición Digital, del Plan Estatal de Investigación Científica, Técnica y de Innovación 2021- 2023, en el Marco del Plan de Recuperación, Transformación y Resiliencia

Code according to the funding entity: TED2021-130369BC33.

Start-End date: 01/12/2022 - 30/11/2024

Duration: 2 years

Total amount: 154.905 €

4 Name of the project: CRIPTOGRAFIA CUANTICA BASADA EN INTERFERENCIA CUANTICA PARA COMUNICACIONES SEGURAS (PID2020-118178RB-C22)

Entity where project took place: Consejo Superior de Investigaciones Científicas

Type of entity: State agency

City of entity: Madrid, Community of Madrid, Spain

Name principal investigator (PI, Co-PI....): Verónica Fernández Mármol

Nº of researchers: 4

Start-End date: 01/09/2021 - 01/09/2024

Total amount: 156.100 €

5 Name of the project: Conexión espacio abierto a fibra. PIEQTP2021-02-002

Identify key words: Quantum computation

Identify key words: Quantum computation

Type of project: Research and development, including transfer

Geographical area: National

Degree of contribution: Researcher

Entity where project took place: Instituto de Tecnologías Físicas y de la Información "Leonardo Torres Quevedo" CSIC

Type of entity: Public Research Body

City of entity: Madrid, Community of Madrid, Spain

Name principal investigator (PI, Co-PI....): Verónica Fernández Mármol

Nº of researchers: 1

Nª people/year: 4

Funding entity or bodies:

Consejo Superior de Investigaciones Científicas

Type of entity: State agency

Type of participation: Principal investigator

Name of the programme: Proyecto Intramural

Code according to the funding entity: QTP2102002

Start-End date: 16/03/2021 - 31/12/2023

Duration: 1 year - 9 months - 15 days

Participating entity/entities: Instituto de Tecnologías Físicas y de la Información "Leonardo Torres Quevedo" CSIC

Total amount: 182.000 €



Dedication regime: Full time

- 6** **Name of the project:** Laboratorio de comunicación cuántica. PIEQTP2021-02-001
Type of project: Research and development, including transfer
Geographical area: National
Degree of contribution: Researcher
Entity where project took place: Instituto de Tecnologías Físicas y de la Información "Leonardo Torres Quevedo" CSIC
Type of entity: Public Research Body
City of entity: Madrid, Community of Madrid, Spain
Name principal investigator (PI, Co-PI...): Verónica Fernández Mármol
Nº of researchers: 1
Nª people/year: 4
Funding entity or bodies: Consejo Superior de Investigaciones Científicas
Type of entity: State agency
Type of participation: Principal investigator
Name of the programme: Proyecto Intramural
Code according to the funding entity: QTP2102001
Start-End date: 16/03/2021 - 31/12/2023
Duration: 1 year - 9 months - 15 days
Total amount: 400.000 €
Dedication regime: Full time
- 7** **Name of the project:** Tecnologías Robustas de Distribución Cuántica de Claves para la Nueva Generación de Redes Wireless (ref 202050E232)
Entity where project took place: CSIC
Type of entity: R&D Centre
Nº of researchers: 4
Start-End date: 01/07/2020 - 31/07/2023
Total amount: 252.100 €
- 8** **Name of the project:** Enlace QKD metropolitano en espacio abierto.PIEQTP2021-02-003
Identify key words: Quantum computation
Identify key words: Quantum computation
Type of project: Research and development, including transfer
Geographical area: National
Degree of contribution: Researcher
Entity where project took place: Instituto de Tecnologías Físicas y de la Información "Leonardo Torres Quevedo" CSIC
Type of entity: Public Research Body
City of entity: Madrid, Community of Madrid, Spain
Name principal investigator (PI, Co-PI...): Verónica Fernández Mármol
Nº of researchers: 1
Nª people/year: 4
Funding entity or bodies: Consejo Superior de Investigaciones Científicas
Type of entity: State agency
Type of participation: Principal investigator
Name of the programme: Proyecto Intramural
Code according to the funding entity: QTP2102003
Start-End date: 16/03/2021 - 31/12/2022
Duration: 1 year - 9 months - 15 days
Participating entity/entities: Instituto de Tecnologías Físicas y de la Información "Leonardo Torres Quevedo" CSIC
Dedication regime: Full time



- 9** **Name of the project:** ARTES 4.0 Programme Line: Competitive and Growth
Geographical area: European Union
Degree of contribution: Researcher
Entity where project took place: European Space Agency
Name principal investigator (PI, Co-PI....): Verónica Fernández Mármol
Funding entity or bodies:
European Space Agency
Type of participation: Investigador Principal del C.S.I.C:
Name of the programme: Competitive and Growth
Code according to the funding entity: HSA-DTO-PP-0005; ESA reference: AO/1-12085/20/NL/AF
Start-End date: 01/02/2022 - 01/09/2022
Participating entity/entities: AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS; ALTER TECHNOLOGY TUV NORD SA; CELLNEX TELECOM SA; DAS PHOTONICS SL; GMV AEROSPACE AND DEFENCE SA; HISPASAT, S.A. (prime); INDRA SISTEMAS, SA; INSTITUT DE CIENCIES FOTONIQUES (INSTITUTO DE CIENCIAS FOTONICAS); INSTITUTO DE ASTROFISICA DE CANARIAS; INSTITUTO NACIONAL DE TECNICA AEROESPACIAL ESTEBAN TERRADAS; QUSIDE TECHNOLOGIES SL; SENER AEROESPACIAL SOCIEDAD ANONIMA; TECNOBIT SL; TELEFONICA INVESTIGACION Y DESARROLLO SA; THALES ALENIA SPACE ESPAÑA SA; UNIVERSIDAD DE VIGO; UNIVERSIDAD POLITECNICA DE MADRID
Total amount: 840.720,98 €
- 10** **Name of the project:** Cybersecurity, Network Analysis and Monitoring for the Next Generation Internet
Entity where project took place: Consejo Superior de Investigaciones Científicas
Type of entity: State agency
City of entity: madrid, Spain
Name principal investigator (PI, Co-PI....): Daniel Díaz Sánchez; Abraham Duarte Muñoz; David Arroyo Guardoño; David Camacho Fernández; Juan Manuel Estévez Tapiador
Start-End date: 01/01/2019 - 01/01/2021
Total amount: 422.510 €
- 11** **Name of the project:** Comunicaciones cuánticas con variables continuas
Geographical area: National
Degree of contribution: Researcher
Entity where project took place: C.S.I.C y Universidad Politécnica de Madrid, **Type of entity:** Organismo Publico de Investigación; Universidad
City of entity: Madrid, Community of Madrid, Spain
Name principal investigator (PI, Co-PI....): Vicente Martin Ayuso; Veronica Fernández Mármol
Nº of researchers: 5
Funding entity or bodies: Ministerio de Economía y Competitividad **Type of entity:** Ministerio
City funding entity: Madrid, Community of Madrid, Spain
Type of participation: Team member
Code according to the funding entity: TEC2015-70406-R
Start-End date: 2016 - 2018 **Duration:** 3 years
Total amount: 126.500 €
Dedication regime: Full time
- 12** **Name of the project:** Quantum Information Technologies Madrid +
Geographical area: National
Degree of contribution: Researcher



Entity where project took place: C.S.I.C.
Univesidad Politécnica de Madrid, Universidad
Complutense de Madrid; Universidad Carlos III de
Madrid

Type of entity: Organismo Público de Investigación;
Universidades

City of entity: Madrid, Community of Madrid, Spain

Name principal investigator (PI, Co-PI....): Miguel Martín-Delgado Alcántara; Veronica Fernández Mármol

Nº of researchers: 20

Funding entity or bodies:

Comunidad de Madrid

Type of entity: Comunidad Autónoma

City funding entity: Madrid, Community of Madrid, Spain

Code according to the funding entity: Comunidad de Madrid S2013/ICE-2801

Start-End date: 2014 - 2018

Total amount: 580.060 €

Dedication regime: Full time

13 Name of the project: Redes Cuánticas Híbridas

Geographical area: National

Degree of contribution: Researcher

Entity where project took place: C.S.I.C.
Universidad Politécnica de Madrid

Type of entity: Organismo Público de Investigación;
Universidad

City of entity: Madrid, Community of Madrid, Spain

Name principal investigator (PI, Co-PI....): Vicente Martín Ayuso; Veronica Fernández Mármol

Nº of researchers: 7

Funding entity or bodies:

Ministerio de Economía y Competitividad

Type of entity: Ministerio

City funding entity: Madrid, Community of Madrid, Spain

Code according to the funding entity: TEC2012-35673

Start-End date: 06/08/2012 - 07/08/2015

Duration: 3 years

Total amount: 58.000 €

Dedication regime: Full time

14 Name of the project: CUántica y CaOs (CUCO):Algoritmos Criptográficos de Frontera

Geographical area: National

Degree of contribution: Researcher

Entity where project took place: C.S.I.C.

Type of entity: Public Research Body

City of entity: Madrid, Community of Madrid, Spain

Name principal investigator (PI, Co-PI....): Gonzalo Álvarez Marañón; Veronica Fernández Mármol

Nº of researchers: 7

Funding entity or bodies:

Ministerio de Ciencia e Innovación

Type of entity: Ministerio

City funding entity: Madrid, Community of Madrid, Spain

Start-End date: 01/12/2008 - 01/12/2011

Duration: 3 years

Total amount: 100.000 €

Dedication regime: Full time

15 Name of the project: Criptografía cuántica a través del aire

Geographical area: National

Degree of contribution: Researcher

Entity where project took place: C.S.I.C. Proyecto intramural

City of entity: Madrid, Community of Madrid, Spain



Name principal investigator (PI, Co-PI....): Veronica Fernández Mármol
Nº of researchers: 1
Funding entity or bodies:
C.S.I.C.

Type of participation: Principal investigator
Code according to the funding entity: 2009501073
Start-End date: 01/01/2010 - 31/12/2010 **Duration:** 1 year
Total amount: 30.000 €

16 Name of the project: Tecnologías de Computación Cuántica; Criptografía, Computación y Simulación
Geographical area: National
Degree of contribution: Researcher
Entity where project took place: Universidad Complutense de Madrid, C.S.I.C.; Universidad Carlos III; Universidad Politécnica de Madrid **Type of entity:** U iversidades; Organismo Público de Investigación
City of entity: Madrid, Community of Madrid, Spain
Name principal investigator (PI, Co-PI....): Miguel Ange Martín-Delgado Alcántara; Veronica Fernández Mármol
Nº of researchers: 6
Funding entity or bodies: Comunidad de Madrid **Type of entity:** Comunidad Autónoma
City funding entity: Madrid, Community of Madrid, Spain
Type of participation: Team member
Start-End date: 01/01/2010 - 31/12/2010 **Duration:** 1 year
Total amount: 30.000 €
Dedication regime: Full time

17 Name of the project: SEGUR@: Seguridad y confianza en la sociedad de la Información
Degree of contribution: Researcher
Entity where project took place: Consejo Superior de Investigaciones Científicas **Type of entity:** State agency
City of entity: Madrid, Community of Madrid, Spain
Name principal investigator (PI, Co-PI....): Luis Hernández Encinas
Nº of researchers: 8
Funding entity or bodies: CDTI
Telefónica I+D **Type of entity:** Business
City funding entity: Madrid, Community of Madrid, Spain
Type of participation: Team member
Name of the programme: CENIT
Start-End date: 01/01/2007 - 31/12/2010 **Duration:** 4 years
Participating entity/entities: Consejo Superior de Investigaciones Científicas; Telefónica I+D
Total amount: 684.418 €

18 Name of the project: Criptografía cuántica a través del espacio libre
Geographical area: National
Degree of contribution: Researcher
Entity where project took place: C.S.I.C. Proyecto bilateral
City of entity: Madrid, Community of Madrid, Spain



Name principal investigator (PI, Co-PI....): Veronica Fernández Mármol

Nº of researchers: 1

Funding entity or bodies:

C.S.I.C.

Type of entity: Public Research Body

City funding entity: Madrid, Community of Madrid, Spain

Type of participation: Principal investigator

Code according to the funding entity: PA1002713

Start-End date: 16/06/2010 - 14/09/2010

Duration: 3 months

Total amount: 6.300 €

Dedication regime: Full time

19 Name of the project: Self-Compensated Gigahertz Quantum Key Distribution

Degree of contribution: Researcher

Entity where project took place: Universidad

Type of entity: University

Heriot-Watt

City of entity: United Kingdom

Name principal investigator (PI, Co-PI....): Gerald S. Buller

Nº of researchers: 4

Funding entity or bodies:

Engineering and Physical Sciences Research Council **Type of entity:** State agency

EPSRC (EP/E003729) (Agencia gubernamental

británica de financiación de proyectos de i+d

City funding entity: United Kingdom

Type of participation: Team member

Start-End date: 2007 - 2010

Participating entity/entities: Universidad Heriot-Watt (Reino Unido)

20 Name of the project: HESPERIA (*H*omeland s*E*curity: tecnología*S* Para la s*E*guridad integ*R*al en espac*l*os publicos e infr*A*estructuras

Degree of contribution: Researcher

Name principal investigator (PI, Co-PI....): Amparo Fúster Sabater

Nº of researchers: 8

Funding entity or bodies:

CEDETI

City funding entity: Madrid, Community of Madrid, Spain

Soluciones Avanzadas de Control (SAC)

City funding entity: Madrid, Community of Madrid, Spain

Type of participation: Team member

Start-End date: 01/01/2006 - 31/12/2009

Duration: 4 years

Participating entity/entities: Consejo Superior de Investigaciones Científicas; Soluciones Avanzadas de Control (SAC)

Total amount: 563.667 €

21 Name of the project: Investigación en sistemas experimentales de distribución cuántica de claves para la seguridad de la información, englobadas en el conjunto de nuevas técnicas que constituye la información cuántica.

Geographical area: National

Degree of contribution: Researcher

Entity where project took place: C.S.I.C. Proyecto bilateral

City of entity: Madrid, Community of Madrid, Spain



Name principal investigator (PI, Co-PI....): Veronica Fernández Mármol

Nº of researchers: 1

Funding entity or bodies:

C.S.I.C.

Type of entity: Public Research Body

City funding entity: Madrid, Community of Madrid, Spain

Type of participation: Principal investigator

Code according to the funding entity: PA1002110

Start-End date: 01/05/2009 - 31/07/2009

Duration: 3 months

Total amount: 6.900 €

Dedication regime: Full time

22 Name of the project: Nuevos protocolos de seguridad y algoritmos criptograficos para la proteccion de servicios telematicos

Geographical area: National

Degree of contribution: Researcher

Entity where project took place: C.S.I.C.

Type of entity: Public Research Body

City of entity: Madrid, Community of Madrid, Spain

Name principal investigator (PI, Co-PI....): Fausto Montoya Vitini; Amparo Fúster Sabater; Veronica Fernandez Mármol

Nº of researchers: 9

Type of participation: Team member

Code according to the funding entity: TSI2007-62657

Start-End date: 01/01/2007 - 31/12/2008

Duration: 2 years

Total amount: 12.100 €

23 Name of the project: Covert Range-finding Using Photon Counting Time-of-Flight

Geographical area: European Union

Degree of contribution: Researcher

Entity where project took place: Universidad Heriot-Watt

City of entity: United Kingdom

Name principal investigator (PI, Co-PI....): Gerald S. Buller

Nº of researchers: 4

Type of participation: Team member

Start-End date: 2006 - 2008

Participating entity/entities: Universidad Heriot-Watt (Reino Unido)

Total amount: 185.000 €

24 Name of the project: Covert Scanning of Low Signatures Targets Using High-speed Photon Counting

Geographical area: European Union

Degree of contribution: Researcher

Entity where project took place: Universidad Heriot-Watt

Type of entity: University

City of entity: United Kingdom

Name principal investigator (PI, Co-PI....): Gerald S. Buller

Nº of researchers: 6

Funding entity or bodies:

Electromagnetic-Remote Sensing (EMRS) Defense Technology Centre (DTC)(Centro tecnológico perteneciente al Ministerio de Defensa Británico

City funding entity: United Kingdom

Type of participation: Team member



Start-End date: 2006 - 2008

Participating entity/entities: Universidad Heriot-Watt (Reino Unido)

25 Name of the project: SECOQC (Development of a Global Network for Secure Communication based on Quantum Cryptography)

City of entity: Spain

Funding entity or bodies:

Union Europea (Framework 6: FP6-2002-IST-1-506813)

Start-End date: 2004 - 2008

Participating entity/entities: CNRS (Francia); Heriot-Watt University,; Hewlett-Packard Ltd; Id Quantique SA., (Suiza); QinetiQ Limited (Reino Unido);; Toshiba Research Europe Ltd.;; University Of Cambridge,; University Of Geneva; University Of Sheffield; University of Bristol; University of Warwick

26 Name of the project: Quantum Cryptography Using Quantum Dot Single Photon Emitters

Entity where project took place: Universidad Heriot-Watt

Name principal investigator (PI, Co-PI....): Gerald S. Buller

Nº of researchers: 8

Funding entity or bodies:

Engineering and Physical Sciences Research Council **Type of entity:** State agency
EPSRC (GR/T09392/01)

City funding entity: United Kingdom

Start-End date: 2004 - 2007

Participating entity/entities: Universidad Heriot-Watt; Universidad de Sheffield (Reino Unido)

27 Name of the project: QUICK (Quantum Encryption In Multi-User Optical Networks at GigaHertz Clock Rates)

Geographical area: European Union

Entity where project took place: Engineering and Physical Sciences Research Council EPSRC (GR/N12466/01) (Agencia gubernamental británica de financiación de proyectos de i+d)

City of entity: United Kingdom

Name principal investigator (PI, Co-PI....): Gerald S. Buller

Nº of researchers: 4

Start-End date: 2000 - 2004

Participating entity/entities: Universidad Heriot-Watt

R&D non-competitive contracts, agreements or projects with public or private entities

Name of the project: "PETs controls matrix: A systematic approach for assessing online and mobile privacy tools",

Type of project: Demonstration, pilot projects, conceptual formulations and design of processes and services

Entity where project took place: Centro de Tecnologías Físicas Leonardo Torres Quevedo

Degree of contribution: Researcher

Entity where project took place: Centro de Tecnologías Físicas Leonardo Torres Quevedo

Type of entity: State agency

City of entity: Madrid, Community of Madrid, Spain

Name principal investigator (PI, Co-PI....): Luis Hernández Encinas; Agustín Martín Muñoz; Verónica Fernández Mármol; Víctor Gayoso Martínez; Natalia Denisenko; José Ignacio Sánchez García

Nº of researchers: 6

Participating entity/entities: Centro de Tecnologías Físicas Leonardo Torres Quevedo

**Funding entity or bodies:**

Agencia Europea de Seguridad de las Redes y de la Información **Type of entity:** Agencia de la Unión Europea

Code according to the funding entity: ENISA-OUT-2016-1274

Start date: 13/03/2016

Duration: 6 months

Total amount: 54.000 €

Relevant results: The tasks developed in this contract were the establishment of a methodology to evaluate the privacy services online and mobile applications available today. This contract was obtained in a publicly competitive international tender (<https://www.ecneu.com/news/29/12/2015/1684>). The report generated in this project has been cited by diverse public and private organisms, such as the Office of the Private Commissioner of Canada (https://www.priv.gc.ca/en/opc-actions-and-decisions/research/explore-privacy-research/2017/pet_201711/), European Union Agency for Fundamental Rights and Council of Europe, 2018, (<https://maritimecyprus.files.wordpress.com/2018/06/handbook-on-european-data-protection-law-2018.pdf>), international associations (https://www.risk-compliance-association.com/Monday_January_16_2017_Top_10_Risk_Compliance_News_Events.pdf); and private agencies (<http://www.cesaregallotti.it/Pdf/Newsletter/201701-ITServiceManagementNews.pdf>). Moreover, the funding agency of this contract, ENISA, is a security authority in cybersecurity, which actively assists in the development of cybersecurity strategies, elaborates studies and reports on cybersecurity matters, and helps drafting the legal framework of the EU policy on security and networks.

Results**Industrial and intellectual property**

- 1 Title registered industrial property:** DISPOSITIVO Y PROCEDIMIENTO DE DEMODULACIÓN ASISTIDA POR TONO PILOTO EN SISTEMAS DE COMUNICACIÓN ÓPTICA COHERENTE

Author's rights: Yes

Inventors/authors/obtainers: Andres Ruiz Chamorro; Verónica Fernández Mármol; Daniel Cano Reol

Entity holder of rights: Consejo Superior de Investigaciones Científicas

Reference/registry code: ES1641.1888

Nº of application: 202330512

Country of inscription: Spain, Community of Madrid

Date of register: 20/06/2023

Nº of patent: 202330512

- 2 Title registered industrial property:** Sistema y Procedimiento de Codificación y Corrección de los Estados de Polarización del Protocolo BB84

Type of industrial property: Patent of invention **Author's rights:** Yes

Inventors/authors/obtainers: Adrián Llanos Velasco; Pablo Arteaga Díaz; Verónica Fernández Mármol

Entity holder of rights: Consejo Superior de Investigaciones Científicas

Nº of application: P202330575

Country of inscription: Spain, Community of Madrid

Date of register: 03/04/2023

Nº of patent: P202330575

Spanish patent: Yes

Operating aut.region/region: Community of Madrid, Spain

Identify key words: Computer aspects



- 3 Title registered industrial property:** Continuous-variable Quantum Key Distribution Simulation Software
Entity holder of rights: CSIC
Nº of application:
<https://ropsten.etherscan.io/tx/0xdb51f3ebf9a4915eac8606bafa71e528b422f84a24a03b0d3b2cc22208d0085c>
Date of register: 07/03/2023
- 4 Title registered industrial property:** Software para el cálculo de la tasa de clave secreta de un enlace de distribución cuántica de clave desde un satélite en órbita geostacionaria a tierra
Entity holder of rights: CSIC, IAC, UdeVigo, Thales Alenia Space e Hispasat
Nº of application:
<https://ropsten.etherscan.io/tx/0x7023f31ef66ca7436d0232982432024b2760d99eb09e65db5205c5feb5f1b196>
Date of register: 26/01/2023
Conferral date: 05/02/2023
- 5 Title registered industrial property:** Dispositivo y Procedimiento de Seguimiento Automático de Polarización.
Inventors/authors/obtainers: Verónica Fernández Mármol; Natalia Denisenko
Entity holder of rights: Consejo Superior de Investigaciones Científicas
Nº of application: P202030592
Country of inscription: Spain, Community of Madrid
Date of register: 18/06/2020
Nº of patent: ES1641.1556
Spanish patent: Yes **EU patent:** Yes
Operating aut.region/region: Community of Madrid, Spain

Transferencia e intercambio de conocimiento

Veronica has a long history of collaboration with industrial partners. Among them is Thales Alenia Space and Hispasat within the funded ESA project Caramuel with whom she collaborated and her team from CSIC and they together registered a software for the calculation of secret key exchange through quantum key distribution between a satellite and earth. Veronica also collaborates with Telefonica and Indra within the project EuroQCI-Spain for the development of quantum communication infrastructure; with GMV —leader in the security, defence and aerospace sectors at national level - in quantum-enhanced navigation positioning and timing systems. In the aerospace sector, Veronica also leads CSIC's input to SPAQUA, Spanish Quantum Alice, a colaboracon publico-privada, recently started with Airbus, for the development of a spatialized QKD transmitter.

She is the author of three patents, two of them licenced to CSIC's spinoff QDynamics, and two registered softwares. The spinoff offers QKD devices that have been previously researched and developed by CSIC's group.



Scientific and technological activities

Scientific production

Publications, scientific and technical documents

- 1 Andrés Ruiz Chamorro; Daniel Cano; Aida García Callejo; Verónica Fernández Mármol. Effects of experimental impairments on the security of continuous-variable quantum key distribution. *Heliyon*. 9 - 6, CelPress, 15/06/2023. Available on-line at: <<https://www.sciencedirect.com/science/article/pii/S240584402303877X?via%3Dihub>>.

DOI: 10.1016/j.heliyon.2023.e16670

Type of production: Scientific paper

Position of signature: 4

Total no. authors: 4

Relevant publication: Yes

Format: Journal

Degree of contribution: Author or co-author of article in journal with external admissions assessment committee

Corresponding author: Yes
- 2 Andrés Ruiz Chamorro; Aida García Callejo; Verónica Fernández Mármol. Low-complexity continuous-variable quantum key distribution with true local oscillator using pilot-assisted frequency locking. *Scientific Reports*. 14 - 10770, Springer Nature, 15/06/2023. Available on-line at: <<https://doi.org/10.1038/s41598-024-61461-0>>.

Type of production: Scientific paper

Position of signature: 3

Total no. authors: 3

Relevant results: Este artículo presenta un esquema de distribución cuántica de claves de variable continua (CVQKD, por sus siglas en inglés) que destaca por su baja complejidad y utiliza un oscilador local verdadero. Se introduce un método asistido por piloto para el bloqueo de frecuencia, lo que mejora la estabilidad y la seguridad del sistema. Este enfoque simplifica significativamente la implementación práctica de CVQKD, lo que lo hace más accesible para aplicaciones del mundo real. Los resultados demuestran la viabilidad del sistema propuesto y su potencial para la comunicación cuántica segura a gran escala.

Relevant publication: Yes

Format: Journal

Degree of contribution: Author or co-author of article in journal with external admissions assessment committee

Corresponding author: Yes
- 3 Pablo Arteaga Díaz; Natalia Denisenko; Verónica Fernández Mármol. Modeling the effect of steering mirrors on polarization for free-space quantum key distribution. *OPTIK*. 265, Madrid, Community of Madrid(Spain): 01/09/2022. Available on-line at: <<https://doi.org/10.1016/j.ijleo.2022.169434>>.

DOI: 10.1016/j.ijleo.2022.169434

Type of production: Scientific paper

Position of signature: 3

Total no. authors: 3

Relevant publication: Yes

Format: Journal

Degree of contribution: Author or co-author of article in journal with external admissions assessment committee

Corresponding author: Yes
- 4 Pablo Arteaga Díaz; Daniel Cano Reol; Verónica Fernández Mármol. Practical Side-Channel Attack on Free-Space QKD Systems With Misaligned Sources and Countermeasures. *IEEE Access*. 10, pp. 82697 - 82705. 05/08/2022. Available on-line at: <<http://dx.doi.org/10.1109/access.2022.3196677>>. ISSN 2169-3536

DOI: 10.1109/access.2022.3196677

Type of production: Scientific paper

Position of signature: 3

Total no. authors: 3

Format: Journal

Degree of contribution: Author or co-author of article in journal with external admissions assessment committee



Relevant publication: Yes

- 5** Luis Hernández Encinas; Ricardo Martínez Martínez; Iluminada Baturone Castillo; Verónica Fernández Mármol; Agustín Martín Muñoz; Santiago Sánchez Solano; Lluís Terés Terés. Trust and Security in the Digital Information. Digital & Complex Information. CSIC Scientific Challenges: Towards 2030. 10, pp. 91 - 109. Madrid, Community of Madrid(Spain): C.S.I.C., 2021. Available on-line at: <http://libros.csic.es/product_info.php?products_id=1523>. ISBN 978-84-00-10756-7

Legal deposit: M-2426-2021

Type of production: Scientific book or monograph

Position of signature: 4

Total no. authors: 7

Relevant publication: Yes

Format: Book

Degree of contribution: Author or co-author of chapter in book

Corresponding author: Yes

- 6** P Merino Pérez; A Jimenez Girela; Pablo Arteaga Díaz; Veronica Fernandez Marmol; Alberto Álvarez Herrero. Inflight demonstrator of quantum key distribution between CubeSats of Q-ANSER program. Proceedings of SPIE12633, Photonics for Quantum 2023, 126330C. pp. 1 - 4. SPIE DIGITAL LIBRARY, 2023.

Type of production: Scientific paper

Corresponding author: Yes

- 7** Daniel Cano; Daniel Balado; Veronica Fernandez Marmol. Photonic integrated circuits and components for quantum key distribution. Proceedings of the 2023 23rd International Conference on Transparent Optical Networks (ICTON), pp. 1 - 4. Springer, Cham., 2023.

Type of production: Scientific paper

Corresponding author: Yes

- 8** Aida García Callejo; Andrés Ruiz Chamorro; Daniel Cano Reol; Verónica Fernández Mármol. A Review on Continuous-Variable Quantum Key Distribution Security. Proceedings of the International Conference on Ubiquitous Computing & Ambient Intelligence (UCAmI 2022). 594 - 415, Springer Link, 02/12/2022.

Type of production: Scientific paper

Format: Book

- 9** Veronica Fernandez Marmol; Amalia Orúe López; David Arroyo Guardado. Securing Blockchain with Quantum Safe Cryptography: When and How?. 13th International Conference on Computational Intelligence in Security for Information Systems (CISIS 2020). 1267, pp. 371 - 379. Springer, Cham., 2021.

Type of production: Scientific paper

Corresponding author: Yes

- 10** Pablo Arteaga- Diaz; Magín Parra Serrano; Natalia Denisenko; Veronica Fernandez Marmol. Correcting Polarization Degradation in Free-Space QKD Systems. 2020 22nd International Conference on Transparent Optical Networks (ICTON). 2020 22nd ICTON, pp. 1 - 4. Springer, 2020.

DOI: <https://ieeexplore.ieee.org/document/9203359>

Type of production: Scientific paper

Corresponding author: No

- 11** Pablo Arteaga-Díaz; Alejandro Ocampos-Guillén; Veronica Fernandez. Enabling QKD under Strong Turbulence for Wireless Networks with Tilt Wavefront Correction. 2019 21st International Conference on Transparent Optical Networks (ICTON). IEEE, 19/09/2019. ISBN 9781728127798

DOI: 10.1109/ICTON.2019.8840410

Type of production: Scientific paper

Corresponding author: Yes

Relevant publication: No



- 12** Alejandro Campos Guillén; Jorge Gómez García; Natalia Denisenko; Verónica Fernández Mármol. Double-Loop Wavefront Tilt Correction for Free-Space Quantum Key Distribution. IEEE Access. 7, pp. 114033 - 114041. 28/08/2019. ISSN 2169-3536
DOI: 101109/ACCESS.2019.2933694
Type of production: Scientific paper
Position of signature: 4
Total no. authors: 4
Format: Journal
Degree of contribution: Author or co-author of article in journal with external admissions assessment committee
Corresponding author: Yes
- 13** Alejandro Ocampos-Guillén; Natalia Denisenko; Verónica Fernández Mármol. Optimising the interconnection of free-space to fibre quantum networks. EPJ Web of Conferences. 198 - 00007, 15/01/2019. Available on-line at: <https://www.epj-conferences.org/articles/epjconf/abs/2019/03/epjconf_qtech2018_00007/epjconf_qtech2018_00007.html>. ISSN 2100-014X
DOI: <https://doi.org/10.1051/epjconf/201919800007>
Type of production: Scientific paper
Position of signature: 4
Total no. authors: 4
Format: Journal
Degree of contribution: Author or co-author of article in journal with external admissions assessment committee
Corresponding author: Yes
- 14** Verónica Fernández Mármol; Jorge Gómez García; Alejandro Ocampos Guillén; Alberto Carrasco Casado. Correction of Wavefront Tilt Caused by Atmospheric Turbulence Using Quadrant Detectors for Enabling Fast Free-Space Quantum Communications in Daylight. IEEE Access. 6 - 1, pp. 3336 - 3345. 2018. ISSN 2169-3536
Type of production: Scientific paper
Position of signature: 1
Total no. authors: 4
Relevant results: In this article, several techniques for compensating turbulent effects are experimentally analysed and compared for quantum communications aerial systems achieving improvements in the quantum bit error rate of these systems of more than 50%. The CV holder directed the research methodology and lines of action and actively participated on the lab measurements as well as in the editing of the research article. This article is published in IEEE Access, a quartil 1 journal published in the IEEE free access database: IEEE Xplore® digital library.
Format: Journal
Degree of contribution: Author or co-author of article in journal with external admissions assessment committee
- 15** Alberto Carrasco Casado; Natalia Denisenko; Verónica Fernández Mármol. Chromatic effects in beam wander correction for free-space quantum communications. Microwave and Optical Technology Letters. 58, pp. 1362 - 1364. 2016.
Type of production: Scientific paper
Position of signature: 3
Total no. authors: 3
Format: Journal
Degree of contribution: Author or co-author of article in journal with external admissions assessment committee
- 16** Alberto Carrasco Casado; Natalia Denisenko; Veronica Fernández Mármol. Correction of beam wander for a free-space quantum key distribution system operating in urban environment. Optical Engineering. 53, pp. 084112-1 - 084112-8. 2014.
Type of production: Scientific paper
Position of signature: 3
Total no. authors: 3
Degree of contribution: Author or co-author of article in journal with external admissions assessment committee
- 17** Verónica Fernández Mármol; Amalia B Orue; David Arroyo; Diego Soto; Natalia Denisenko; María José García Martínez. High-speed free-space quantum key distribution system for urban daylight applications. Applied Optics. 52, pp. 3311 - 3317. 2013.
Type of production: Scientific paper
Position of signature: 6
Total no. authors: 6
Format: Journal
Citations: 4



- 18** María José García Martínez; Diego Soto; Natalia Denisenko; Verónica Fernández Mármol. Distribución cuántica de claves en espacio libre. *Óptica Pura y Aplicada*. 44, pp. 221 - 227. 2011.
Type of production: Scientific paper **Format:** Journal
Position of signature: 4
Total no. authors: 4
- 19** R. J. Collins; P. J. Clarke; Verónica Fernández Mármol; K. J. Gordon; M. N. Makhonin; J. A. Timpson; A. Tahraoui; M. Hopkinson; A. M. Fox; M. S. Skolnick; G. S. Buller. Quantum key distribution system in standard telecommunications fiber using a short wavelength single photon source. *Journal of Applied Physics*. 107, pp. 073102 - 073102-6. 2010.
Type of production: Scientific paper
Position of signature: 3
Total no. authors: 11
Citations: 14
- 20** Gerardo Pastor Dégano; Miguel Romera; Gonzalo Álvarez Marañón; David Arroyo Guardado; Amalia B. Orúe López; Verónica Fernández Mármol; Fausto Montoya Vitini. A general view of pseudoharmonics and pseudoantiharmonics to calculate external arguments of Douady and Hubbard. *Applied Mathematics and Computation*. 213, pp. 484 - 497. 2009.
Type of production: Scientific paper **Format:** Journal
Position of signature: 6
Total no. authors: 7
Citations: 6
- 21** Amalia B. Orúe López; Verónica Fernández Marmó; Gonzalo Álvarez Marañón; Miguel Romera; Fausto Montoya Vitini; S. Li. Breaking a SC-CNN-based Chaotic Masking Secure Communication System. *International Journal of Bifurcation and Chaos*. 9, pp. 1329 - 1338. 2009.
Type of production: Scientific paper **Format:** Journal
Position of signature: 2 **Degree of contribution:** Author or co-author of article in journal with external admissions assessment committee
Total no. authors: 7
Citations: 3
- 22** David Arroyo Guardado; Gonzalo Álvarez Marañón; S Li; C Li; Verónica Fernández Marmól. Cryptanalysis of a new chaotic cryptosystem based on ergodicity. *International Journal of Modern Physics B*. 23, pp. 651 - 659. 2009.
Type of production: Scientific paper **Format:** Journal
Position of signature: 1 **Degree of contribution:** Author or co-author of article in journal with external admissions assessment committee
Total no. authors: 5
Citations: 13
- 23** Aongus McCarthy; Robert J. Collins; Nils J. Krichel; Verónica Fernández Mármol; Andrew M. Wallace; Gerald S. Buller. Long-range time-of-flight scanning sensor based on high-speed time-correlated single-photon counting. *Applied Optics*. 48, pp. 6241 - 6251. 2009.
Type of production: Scientific paper **Format:** Journal
Position of signature: 3
Total no. authors: 6
Citations: 84



- 24** Gerardo Pastor Dégano; Miguel Romera; Gonzalo Álvarez Marañón; David Arroyo Guardado; Amalia B. Orúe López; Verónica Fernández Mármol; Fausto Montoya Vitini. Algorithm for external arguments calculation of the nodes of a shrub in the Mandelbrot set. *Fractals*. 16, pp. 159 - 168. 2008.
Type of production: Scientific paper
Position of signature: 6
Total no. authors: 7
Format: Journal
Degree of contribution: Author or co-author of article in journal with external admissions assessment committee
Citations: 7
- 25** Amalia B. Orúe López; Verónica Fernández Mármol; Gonzalo Álvarez Marañón; Gerardo Pastor Dégano; Miguel Romera; Fausto Montoya Vitini. Determination of the parameters for a Lorenz system and application to break the security of two-channel chaotic cryptosystems. *Physics Letters A*. 372, pp. 5588 - 5592. 2008.
Type of production: Scientific paper
Position of signature: 2
Total no. authors: 6
Format: Journal
Degree of contribution: Author or co-author of article in journal with external admissions assessment committee
Citations: 15
- 26** Miguel Romera; Gonzalo Álvarez Marañón; David Arroyo Guardado; Amalia B. Orúe López; Verónica Fernández Mármol; Gerardo Pastor Dégano. Drawing and computing external rays in the multiple-spiral medallions of the Mandelbrot set. *Computer and Graphics*. 32, pp. 597 - 610. 2008.
Type of production: Scientific paper
Position of signature: 5
Total no. authors: 6
Degree of contribution: Author or co-author of article in journal with external admissions assessment committee
Citations: 5
- 27** David Arroyo Guardado; R. Rhouma; Gonzalo Álvarez Marañón; S. Li; Verónica Fernández Mármol. On the security of a new image encryption scheme based on chaotic map lattices. *Chaos*. 18, 2008.
Type of production: Scientific paper
Position of signature: 5
Total no. authors: 5
Source of citations: WOS
Format: Journal
Degree of contribution: Author or co-author of article in journal with external admissions assessment committee
Citations: 57
- 28** R.J. Collins; R.H. Hadfield; Verónica Fernández Mármol; S.W. Nam; G.S. Buller. Low timing jitter detector for gigahertz quantum key distribution. *Electronics Letters*. 43, pp. 180 - 182. 2007.
Type of production: Scientific paper
Position of signature: 3
Total no. authors: 5
Degree of contribution: Author or co-author of article in journal with external admissions assessment committee
Citations: 35
- 29** Verónica Fernández Mármol; R.J. Collins; K.J. Gordon; P.D. Townsend; G.S. Buller. Passive optical network approach to gigahertz-clocked multi-user quantum key distribution. *IEEE Journal of Quantum Electronics*. 43, pp. 130 - 138. 2007.
Type of production: Scientific paper
Position of signature: 1
Total no. authors: 5
Format: Journal
Degree of contribution: Author or co-author of article in journal with external admissions assessment committee

**Source of citations:** WOS**Citations:** 49

- 30** K.J. Gordon; Verónica Fernández Mármol; G.S. Buller; I. Rech; S.D. Cova; P.D. Townsend. Quantum key distribution system clocked at 2 GHz. *Optics Express*. 13, pp. 3015 - 3020. 2005.

DOI: 10.1364/OPEX.13.003015**Type of production:** Scientific paper**Position of signature:** 2**Degree of contribution:** Author or co-author of article in journal with external admissions assessment committee**Total no. authors:** 6**Source of citations:** WOS**Citations:** 95

- 31** K.J. Gordon; Verónica Fernández Mármol; P.D. Townsend; G.S. Buller. A Short Wavelength GigaHertz Clocked Fiber–Optic Quantum Key Distribution System. *IEEE Journal of Quantum Electronics*. 40, pp. 900 - 900. 2004.

Type of production: Scientific paper**Position of signature:** 2**Degree of contribution:** Author or co-author of article in journal with external admissions assessment committee**Total no. authors:** 4**Source of citations:** WOS**Citations:** 105

- 32** Alberto Carrasco Casado; Verónica Fernández Mármol; Natalia Denisenko. Free-Space Quantum Key Distribution. *Optical Wireless Communications*. pp. 586 - 607. Springer International Publishing, 11/2016. Available on-line at: <http://link.springer.com/chapter/10.1007/978-3-319-30201-0_27>. ISBN 978-3-319-30200-3

DOI: 10.1007/978-3-319-30201-0_27**Collection:** Signals and Communication Technology**Type of production:** Book chapter**Position of signature:** 2**Format:** Book**Degree of contribution:** Author or co-author of chapter in book**Total no. authors:** 3

- 33** Verónica Fernández Mármol. Quantum Cryptography at High Speed. *Lambert*, 12/2009. Available on-line at: <<http://www.lap-publishing.com/>>. ISBN 978-3-8383-2924-6

Type of production: Scientific book or monograph**Format:** Book**Position of signature:** 1**Total no. authors:** 1

- 34** Andrés Ruiz Chamorro; Aida García Callejo; Verónica FERNÁNDEZ MÁRMOL. Low-complexity continuous-variable quantum key distribution with true local oscillator using pilot-assisted frequency locking. *Scientific Reports*,. 14 - 10770, (Spain): Nature Publishing Group,

Format: Journal**Corresponding author:** Yes

Works submitted to national or international conferences

- 1** **Title of the work:** Quantum Key Distribution desde un satélite geostacionario: estudio de viabilidad del sistema CARAMUEL de Hispasat

Name of the conference: 27th Ka y Conferencia de Comunicaciones de Banda Ancha.**City of event:** Stresa, Italy**Date of event:** 10/2022**City organizing entity:** Stresa, Italy



Juan Gil Montoro; Félix González; Antonio Abad; Pedro Pintó; Ángel Álvaro; Luis Oascual; David Domingo; Marta García; Carlos Miravet; Pablo Campo; Alberto Alberto Álvarez-Herrero; Tomas Belenger; Verónica Fernández Mármol; Marcos Curty. Available on-line at: <https://www.researchgate.net/publication/367220307_Quantum_Key_Distribution_from_a_geostationary_satellite_Hispasat's_CARAMUEL_system_fe>

2 Title of the work: Enhancing continuous-variable quantum key distribution through impairment optimization

Name of the conference: PHOTON22

Corresponding author: Yes

City of event: Nottingham, United Kingdom

Date of event: 30/08/2022

End date: 02/09/2022

Organising entity: Institute of Physics

Andrés Ruiz Chamorro; Alfonso Blanco Blanco; Verónica Fernández Mármol.

3 Title of the work: Quantum communication: challenges and opportunities

Name of the conference: Photon22

Corresponding author: Yes

City of event: Nottingham, United Kingdom

Date of event: 30/08/2022

End date: 02/09/2022

Organising entity: Institute of Physics

"Quantum communication: challenges and opportunities".

4 Title of the work: Impairments Optimization for Continuous-Variable Quantum Key Distribution

Name of the conference: QCRYPT 2022

Corresponding author: Yes

City of event: Taiwan, Taiwan

Date of event: 29/08/2022

Organising entity: QCRYPT

Andrés Ruiz Chamorro; Alfonso Blanco Blanco; Verónica Fernández Mármol.

5 Title of the work: Optimizing experimental calibration in Continuous Variable Quantum Key Distribution to minimize excess noise

Name of the conference: Quantum Information Spain (ICE21)

City of event: Madrid, Spain

Date of event: 10/05/2021

End date: 14/05/2021

Organising entity: MICINN/AEI y RITCE

Andres Ruiz Chamorro; Alfonso Blanco Blanco; Natalia Denisenko; Veronica Fernandez Marmol.

6 Title of the work: Optimizing polarization control for high speed free-space Quantum Key Distribution

Name of the conference: Quantum Information Spain (ICE21)

City of event: Madrid, Spain

Date of event: 10/05/2021

End date: 14/05/2021

Organising entity: MICINN/AEI y RITCE

Pablo Arteaga Diaz; Natalia Denisenko; Veronica Fernandez Marmol.

7 Title of the work: Optimising the interconnection of free-space to fibre quantum networks

Name of the conference: Quantum Technology International Conference 2018 (QTech 2018)

Type of event: Conference

Geographical area: European Union



Type of participation: 'Participatory - poster

City of event: París, France

Date of event: 05/09/2018

End date: 07/09/2018

Organising entity: Laboratoire Kastler Brossel

City organizing entity: París, France

Publication in conference proceedings: Yes

Reasons for participation: Open access

With external admission assessment committee:
Yes

Type of contribution: Scientific paper

Alejandro Ocampos Guillén; Natalia Denisenko Yakucheva; Veronica Fernandez Marmol. "Optimising the interconnection of free-space to fibre quantum networks". En: EPJ Web of Conferences. 198 - 00007, (France): 15/01/2019. ISSN 2100-014X

8 Title of the work: A Review of Cryptographically Secure PRNGs in Constrained Devices for the IoT

Name of the conference: International Joint Conference SOCO'17-CISIS'17-ICEUTE'17

Type of event: Conference

Geographical area: European Union

Type of participation: Participatory - oral communication

Reasons for participation: Open access

Corresponding author: Yes

City of event: León, Castile and León, Spain

Date of event: 06/09/2017

End date: 09/09/2017

Organising entity: Universidad de León

Type of entity: University

City organizing entity: León, Castile and León, Spain

Publication in conference proceedings: Yes

Type of contribution: Scientific paper

Amalia Beatriz Orúe; Luis Hernández Encinas; Verónica Fernández Mármol; Fausto Montoya Vitini. "International Joint Conference SOCO'17-CISIS'17-ICEUTE'17 León, Spain, September 6–8, 2017, Proceeding". pp. 672 - 682. (Spain): 23/08/2017. Available on-line at: <https://link.springer.com/chapter/10.1007/978-3-319-67180-2_65>. ISBN 9783319671796

DOI: 10.1007/978-3-319-67180-2_65

9 Title of the work: Enabling daylight free-space quantum communication through beam stabilization techniques

Name of the conference: Quantum Information in Spain ICE-4

Type of event: Conference

Geographical area: National

Type of participation: Participatory - oral communication

City of event: Madrid, Community of Madrid, Spain

Date of event: 10/07/2017

End date: 14/07/2017

Organising entity: RITCE

Type of contribution: Scientific paper

Verónica Fernández Mármol; Jorge Gómez García; Alejandro Ocampos Guillén; Natalia Denisenko. 2017.

10 Title of the work: Correction of atmospheric turbulent effects with a double fast steering mirror system for fast free-space quantum communications

Name of the conference: 24th Central European Workshop on Quantum Optics

Type of event: Conference

Geographical area: European Union

Type of participation: 'Participatory - poster

City of event: Copenhagen, Denmark

Date of event: 26/06/2017

End date: 30/06/2017



Jorge Gómez García; Miguel Angel Báez Chorro; Natalia Denisenko; Verónica Fernández Mármol.

- 11** **Title of the work:** Herramientas gráficas de la criptografía caótica para el análisis de la calidad de secuencias pseudoaleatorias
Name of the conference: XIV REUNIÓN ESPAÑOLA SOBRE CRIPTOLOGÍA Y SEGURIDAD DE LA INFORMACIÓN (RECSI 2016)
Type of event: Conference **Geographical area:** National
Type of participation: Participatory - invited/keynote **Reasons for participation:** Upon invitation talk
City of event: Menorca, Balearic Islands, Spain
Date of event: 26/10/2016
End date: 28/10/2016
City organizing entity: Menorca, Balearic Islands, Spain
Type of contribution: Scientific paper
Amalia Beatriz Orúe López; Amparo Fúster Sabate; Verónica Fernández Mármol; Fausto Montoya Vitini; Luis Hernández Encinas; Agustín Martín Muñoz. pp. 180. Balearic Islands (Spain): Available on-line at: <<http://recsi16.uib.es/wp-content/uploads/2016/10/ACTAS-RECSI-2016.pdf>>.
- 12** **Title of the work:** Correction of turbulent effects in free-space quantum communications
Name of the conference: Spanish Quantum Information Workshop
Type of event: Workshop **Geographical area:** National
Type of participation: Participatory - oral communication
City of event: Bilbao, Basque Country, Spain
Date of event: 01/06/2015
City organizing entity: Bilbao, Basque Country, Spain
Type of contribution: Scientific paper
Alberto Carrasco Casado; María-José García Martínez; Natalia Denisenko; Verónica Fernández Mármol.
- 13** **Title of the work:** Free-space Mbps quantum key distribution link in Madrid
Name of the conference: XXXIV Reunión bienal de la Real Sociedad Española de Física
Type of event: Conference **Geographical area:** National
Type of participation: Participatory - oral communication
City of event: Valencia, Valencian Community, Spain
Date of event: 15/07/2013
End date: 19/07/2013
City organizing entity: Valencia, Valencian Community, Spain
Type of contribution: Scientific paper
María José García Martínez; Natalia Denisenko; Diego Soto; Alberto Carrasco Casado; Verónica Fernández Mármol. Available on-line at: <<https://digital.csic.es/handle/10261/82665>>.
- 14** **Title of the work:** High-speed free-space quantum key distribution with automatic tracking for short-distance urban links
Name of the conference: VIII Reunión Española de Optoelectrónica, OPTOEL 2013
Type of event: Conference **Geographical area:** National
Type of participation: Participatory - poster
City of event: Alcalá de Henares, Community of Madrid, Spain
Date of event: 10/07/2013
End date: 12/07/2013
City organizing entity: Alcalá de Henares, Community of Madrid, Spain
Alberto Carrasco Casado; María-José García Martínez; Natalia Denisenko; Verónica Fernández Mármol. "Proceedings of the Spanish Meeting on Optoelectronics OPTOEL (Madrid, Spain, 2013)". 2013. Available on-line at: <<https://digital.csic.es/handle/10261/82662>>.



- 15** **Title of the work:** High transmission quantum key distribution link in air
Name of the conference: Workshop Informacion Cuantica en España
Type of event: Conference **Geographical area:** National
Type of participation: Participatory - oral communication
City of event: Madrid, Community of Madrid, Spain
Date of event: 17/09/2012
End date: 19/09/2012
City organizing entity: Madrid, Community of Madrid, Spain
Type of contribution: Scientific paper
María José García Martínez; Diego Soto; Natalia Denisenko; Verónica Fernández Mármol. Community of Madrid (Spain): Available on-line at: <<http://intranet2.csic.es/web/quantum-information-and-foundations-group-quinfog/ice-2012;jsessionid=544DD70C10AB1663AE301233AB30D7CC>>.
- 16** **Title of the work:** Formal Verification of the Security of a Free-Space Quantum Key Distribution System
Name of the conference: World Congress in Computer Science, Computer Engineering, and Applied Computing (WORLDCOMP'11)
Type of event: Conference **Geographical area:** Non EU International
Type of participation: Participatory - oral communication
City of event: Las Vegas, United States of America
Date of event: 18/07/2011
End date: 21/07/2011
Type of contribution: Scientific paper
Verónica Fernández Mármol; María-José García Martínez; Luis Hernández Encinas; Agustín Martín Muñoz. En: Proc. 2011 World Congress in Computer Science, Computer Engineering, and Applied Computing (WORLDCOMP'11), 2011 International Conference on Security and Management (SAM'11).. 2011. Available on-line at: <http://digital.csic.es/bitstream/10261/39346/3/Formal%20verification%20QKD-CSIC-SAM2011_1.pdf>. ISBN 1-60132-196-1
- 17** **Title of the work:** Towards a Short-range Free-space GHz-clocked quantum key distribution system
Name of the conference: International Conference on Quantum Information
Type of event: Conference **Geographical area:** Non EU International
Type of participation: 'Participatory - poster
City of event: Ottawa, Canada
Date of event: 06/06/2011
End date: 08/06/2011
María José García Martínez; Natalia Denisenko; Diego Soto; Verónica Fernández Mármol. Available on-line at: <<http://digital.csic.es/handle/10261/44960>>.
- 18** **Title of the work:** Analysis of Quantum Key Distribution as a Disruptive Technology
Name of the conference: INFORMATION SYSTEMS TECHNOLOGY (IST) PANEL Symposium (IST-099 /RSY-024)
Type of event: Conference **Geographical area:** Internacional
Type of participation: Participatory - oral communication
City of event: Madrid, Community of Madrid, Spain
Date of event: 09/05/2011
End date: 10/05/2011
Organising entity: CESEDEN **Type of entity:** Technological Centre
City organizing entity: Madrid, Community of Madrid, Spain
Type of contribution: Scientific paper



María José García Martínez; Natalia Denisenko; Diego Soto; Verónica Fernández
Mármol. Available on-line at: <<http://digital.csic.es/handle/10261/44953>
<https://www.cso.nato.int/pubs/rdp.asp?RDP=RTO-MP-IST-099>>.

- 19** **Title of the work:** Hacia la distribución cuántica de claves en espacio libre a alta velocidad
Name of the conference: Quantum Optics and Nonlinear Optics (QUONLOP)
Type of event: Conference **Geographical area:** National
Type of participation: Participatory - oral communication
City of event: Valladolid, Castile and León, Spain
Date of event: 10/02/2011
End date: 11/02/2011
City organizing entity: Valladolid, Castile and León, Spain
Type of contribution: Scientific paper
María José García Martínez; Diego Soto; Natalia Denisenko; Verónica Fernández
Mármol. En: Actas del congreso Quonlop. Castile and León (Spain): Available on-line at:
<<http://digital.csic.es/handle/10261/32665>>.
- 20** **Title of the work:** High-speed free-space quantum key distribution system for urban applications
Name of the conference: Recsi 2010
Type of event: Conference **Geographical area:** National
City of event: Tarragona, Catalonia, Spain
Date of event: 07/09/2010
End date: 10/09/2010
City organizing entity: Tarragona, Catalonia, Spain
Type of contribution: Scientific paper
María-José García Martínez; Diego Soto; Natalia Denisenko; David Arroyo Guardado; Amalia B. Orúe
López; Verónica Fernández Mármol. "Actas del congreso Recsi 2010". En: Actas del congreso Recsi 2010.
pp. 333. Catalonia (Spain): 2010. Available on-line at: <<http://digital.csic.es/handle/10261/31103>>. ISBN
9788469333044
- 21** **Title of the work:** High-speed free-space quantum key distribution system for urban applications
Name of the conference: Photon10 (QEP-19)
Type of event: Conference **Geographical area:** Non EU International
Type of participation: 'Participatory - poster
City of event: Southampton, United Kingdom
Date of event: 23/08/2010
End date: 26/08/2010
María José García Martínez; David Arroyo Guardado; Natalia Denisenko; Diego Soto;
Verónica Fernández Mármol. En: Actas del congreso Photon10. pp. 276. Available on-line at:
<<http://digital.csic.es/handle/10261/44963>>.
- 22** **Title of the work:** Scanning of low-signature targets using time-correlated single-photon counting
Name of the conference: SPIE Europe Security + Defence
Type of event: Conference **Geographical area:** European Union
Type of participation: Participatory - oral communication
City of event: Berlín, Germany
Date of event: 31/08/2009
End date: 03/09/2009
Type of contribution: Scientific paper
Nils J. Krichel; Aongus McCarthy; Robert J. Collins Collins; Verónica Fernández Fernández Mármol; Andrew
M. Wallace. En: Proc. SPIE 7482, 748202 (2009). Available on-line at: <[http://spiedigitallibrary.aip.org/getabs/
servlet/GetabsServlet?prog=normal&id=PSISDG007482000001748202000001&idtype=cvips&gifs=Yes](http://spiedigitallibrary.aip.org/getabs/servlet/GetabsServlet?prog=normal&id=PSISDG007482000001748202000001&idtype=cvips&gifs=Yes)>.



- 23** **Title of the work:** On the skew tent map as base of a new image chaos-based
Name of the conference: Second Workshop on Mathematical Cryptology
Type of event: Conference **Geographical area:** National
Type of participation: Participatory - oral communication
City of event: Santander, Cantabria, Spain
Date of event: 22/10/2008
End date: 25/10/2008
City organizing entity: Santander, Cantabria, Spain
Type of contribution: Scientific paper
David Arroyo Guardado; Rhouma Rhouma; Gonzalo Álvarez Marañón; Verónica Fernández Mármol.
Available on-line at: <<http://digital.csic.es/handle/10261/17184>>.
- 24** **Title of the work:** Free-Space Quantum key Distribution Link at Gigahertz Clock Rates
Name of the conference: SECOQC (Development of a Global Network for Secure Communication based on Quantum Cryptography)
Type of event: Conference **Geographical area:** European Union
Type of participation: Participatory - poster
City of event: Viena, Austria
Date of event: 08/10/2008
1; Verónica Fernández Mármol; David Arroyo Guardado; María José García Martínez; Amalia B. Orúe López. Available on-line at: <<http://www.secoqc.net/downloads/abstracts/SECOQC-Fernandez.pdf>>.
- 25** **Title of the work:** Criptoanálisis de un cifrador caótico realizado con redes neuronales celulares
Name of the conference: Recsi X Spanish Meeting on Cryptology and Information Security
Type of event: Conference **Geographical area:** National
Type of participation: Participatory - oral communication
City of event: Salamanca, Castile and León, Spain
Date of event: 07/09/2008
End date: 10/09/2008
City organizing entity: Salamanca, Castile and León, Spain
Type of contribution: Scientific paper
Amalia B. Orúe López; Verónica Fernández Mármol; Gerardo Pastor Dégano; Miguel Romera; Gonzalo Álvarez Marañón; Fausto Montoya Vitini. "Actas de Recsi (X Spanish Meeting on Cryptology and Information Security)". En: Actas de Recsi (X Spanish Meeting on Cryptology and Information Security). pp. 163 - 171. Castile and León (Spain): 2008. Available on-line at: <<http://digital.csic.es/handle/10261/10876>>.
- 26** **Title of the work:** Experimental quantum key distribution at a wavelength of $\lambda \sim 850\text{nm}$
Name of the conference: Recsi X Spanish Meeting on Cryptology and Information Security
Type of event: Conference **Geographical area:** National
Type of participation: Participatory - oral communication
City of event: Salamanca, Castile and León, Spain
Date of event: 07/09/2008
End date: 10/09/2008
City organizing entity: Salamanca, Castile and León, Spain
Type of contribution: Scientific paper
Verónica Fernández Mármol; David Arroyo Guardado; María-José García Martínez; P.A. Hiskett; R.J. Collins; G.S. Buller; Amalia B. Orúe López. "Actas de Recsi (X Spanish Meeting on Cryptology and Information Security)". En: Actas de Recsi (X Spanish Meeting on Cryptology and Information Security). pp. 157 - 161. Castile and León (Spain): 2008. Available on-line at: <<http://hdl.handle.net/10261/5716>>. ISBN 9788469151587



- 27** **Title of the work:** On the inadequacy of the logistic map for cryptographic applications
Name of the conference: Recsi X Spanish Meeting on Cryptology and Information Security
Type of event: Conference **Geographical area:** National
Type of participation: Participatory - oral communication
City of event: Salamanca, Castile and León, Spain
Date of event: 07/09/2008
End date: 10/09/2008
City organizing entity: Salamanca, Castile and León, Spain
Type of contribution: Scientific paper
David Arroyo Guardado; Gonzalo Álvarez Marañón; Verónica Fernández Mármol. "Actas de Recsi (X Spanish Meeting on Cryptology and Information Security)". En: Actas de Recsi (X Spanish Meeting on Cryptology and Information Security). pp. 77 - 82. Castile and León (Spain): 2008. Available on-line at: <<http://digital.csic.es/handle/10261/7208>>.
- 28** **Title of the work:** Conjuntos de Julia alternados
Name of the conference: Congreso Nolineal 2008
Type of event: Conference **Geographical area:** National
Type of participation: Participatory - poster
City of event: Barcelona, Catalonia, Spain
Date of event: 16/06/2008
End date: 19/06/2008
City organizing entity: Barcelona, Catalonia, Spain
Gerardo Pastor Dégano; Gonzalo Álvarez Marañón; Amalia B. Orúe López; Verónica Fernández Mármol; David Arroyo Guardado; Miguel Romera. "Actas Nolineal 2008". En: Actas de Recsi (X Spanish Meeting on Cryptology and Information Security). pp. 198. Catalonia (Spain): Editado por F.Marques y A. Delshams, 2008. Available on-line at: <<http://hdl.handle.net/10261/4981>>. ISBN 9788496736481
- 29** **Title of the work:** Emparejamiento de patrones en medallones de espiral múltiple
Name of the conference: Congreso Nolineal 2008
Type of event: Conference **Geographical area:** National
Type of participation: Participatory - poster
City of event: Barcelona, Catalonia, Spain
Date of event: 16/06/2008
End date: 19/06/2008
City organizing entity: Barcelona, Catalonia, Spain
Gerardo Pastor Dégano; Gonzalo Álvarez Marañón; Amalia B. Orúe López; Verónica Fernández Mármol; David Arroyo Guardado; Miguel Romera. "Actas Nolineal 2008". En: Actas de Recsi (X Spanish Meeting on Cryptology and Information Security). pp. 192. Catalonia (Spain): Editado por F.Marques y A. Delshams, 2008. Available on-line at: <<http://hdl.handle.net/10261/4930>>. ISBN 9788496736481
- 30** **Title of the work:** Covert scanning of low signature targets using high speed photon-counting
Name of the conference: 5th EMRS DTC Conference
Type of event: Conference **Geographical area:** European Union
Type of participation: Participatory - oral communication
City of event: Edimburgo, United Kingdom
Date of event: 06/2008
Type of contribution: Scientific paper
Aongus McCarthy; Robert J. Collins; P.A. Hiskett; C.S. Parry; Verónica Fernández Mármol; S. Hernandez Marin; Andrew M. Wallace; G.S. Buller. Available on-line at: <http://www.emrsdtc.com/conferences/2007/downloads/pdf/conference_papers/B002.pdf>.



- 31 Title of the work:** Time-of-flight sensing using time-correlated single-photon counting
Name of the conference: SPIE Photonics West
Type of event: Conference **Geographical area:** Non EU International
Type of participation: Participatory - oral communication
City of event: San José, California, United States of America
Date of event: 19/01/2008
End date: 24/01/2008
Type of contribution: Scientific paper
Gerald S. Buller; Aongus McCarthy; Robert J. Collins; Philip A. Hiskett; Verónica Fernández Mármol; Sergio Hernández Marín; C.S. Parry; S. Hernandez Marin; Andrew M. Wallace. En: Proceedings of SPIE, Volume 6900. 6900,
- 32 Title of the work:** Gigahertz-Clocked Quantum Key Distribution in Passive Optical Networks
Name of the conference: SPIE Symposium on Quantum Communications Realized, Optics East 2007
Type of event: Conference **Geographical area:** Non EU International
Type of participation: Participatory - oral communication
City of event: Boston, United States of America
Date of event: 09/09/2007
End date: 12/09/2007
Type of contribution: Scientific paper
Verónica Fernández Mármol; Robert J. Collins; K.J. Gordon; P.D. Townsend; Gerald S. Buller. En: Proceedings of SPIE, Volume 6780. 6780,
- 33 Title of the work:** Passive Optical Network Approach to GigaHertz-Clocked Multi-User Quantum Key Distribution
Name of the conference: Quantum Electronics and photonics (QEP-17)
Type of event: Conference **Geographical area:** European Union
Type of participation: Participatory - oral communication
City of event: Manchester, United Kingdom
Date of event: 04/09/2006
End date: 06/09/2006
Type of contribution: Scientific paper
Verónica Fernández Mármol; Robert J. Collins; K.J. Gordon; S.D. Cova; I Rech; P.D. Townsend; Gerald S. Buller.
- 34 Title of the work:** Gigahertz-Clocked Quantum Key Distribution in Passive Optical Networks
Name of the conference: IEEE LEOS Summer Topical Meeting
Type of event: Conference **Geographical area:** Non EU International
Type of participation: Participatory - oral communication
City of event: Quebec, Canada
Date of event: 17/07/2006
End date: 19/07/2006
Type of contribution: Scientific paper
Verónica Fernández Mármol; Robert J. Collins; K.J. Gordon; P.D. Townsend; Gerald S. Buller. Available on-line at: <<http://arxiv.org/abs/quant-ph/0605046>>.
- 35 Title of the work:** Quantum cryptography using Silicon SPADs
Name of the conference: Mini-Symposium on Si-based Optoelectronics (The Rank Prize Fund)
Type of event: Conference **Geographical area:** European Union
Type of participation: Participatory - oral communication
City of event: Inglaterra, United Kingdom



Date of event: 04/2006

End date: 04/2006

Type of contribution: Scientific paper

Verónica Fernández Mármol; K.J. Gordon; Robert J. Collins; S.D. Cova; I Rech; P.D. Townsend.

36 Title of the work: 3.3 Gigahertz-Clocked Quantum Key Distribution in Passive Optical Networks

Name of the conference: ECOC

Type of event: Conference

Geographical area: European Union

Type of participation: Participatory - oral communication

City of event: Glasgow, United Kingdom

Date of event: 21/09/2005

End date: 21/09/2005

Type of contribution: Scientific paper

K.J. Gordon; Verónica Fernández Mármol; Robert J. Collins; I Rech; S.D. Cova; P.D. Townsend; Gerald S. Buller. Available on-line at: <<http://arXiv:quant-ph/0605053v1>>.

37 Title of the work: Quantum Key Distribution in a Multi-User Network at Gigahertz Clock Rates

Name of the conference: SPIE Symposium on Microtechnologies for the New Millennium

Type of event: Conference

Geographical area: European Union

Type of participation: 'Participatory - poster

City of event: Sevilla, Andalusia, Spain

Date of event: 09/05/2005

End date: 11/05/2005

Verónica Fernández Mármol; K.J. Gordon; Robert J. Collins; P.D. Townsend; S.D. Cova; I Rech; Gerald S. Buller. Available on-line at: <<http://arxiv.org/ftp/quant-ph/papers/0605/0605052.pdf>>.

38 Title of the work: Quantum Key Distribution: A Route To Absolutely Secure Encryption

Name of the conference: UK National Science Week

Type of event: Conference

Geographical area: European Union

Type of participation: 'Participatory - poster

City of event: Londres, United Kingdom

Date of event: 11/03/2005

End date: 11/03/2005

K.J. Gordon; Robert J. Collins; Verónica Fernández Mármol; Gerald S. Buller; S.D. Cova; I Rech; P.D. Townsend.

39 Title of the work: Quantum Key Distribution in a Multi-User Network at Gigahertz Clock Rates

Name of the conference: International Conference on Quantum Electronics and Photonics (QEP-16)

Type of event: Conference

Geographical area: European Union

Type of participation: Participatory - oral communication

City of event: Glasgow, United Kingdom

Date of event: 06/09/2004

End date: 06/09/2004

K.J. Gordon; Verónica Fernández Mármol; P.D. Townsend; S.D. Cova; S Tisa; Gerald S. Buller.

40 Title of the work: Quantum key distribution in the first fibre telecommunications window

Name of the conference: ETOS (Emerging Technologies in optical Sciences)

Type of event: Conference

Geographical area: European Union

Type of participation: Participatory - oral communication

City of event: Cork, Ireland

Date of event: 26/07/2004



End date: 29/07/2004

K.J. Gordon; Verónica Fernández Mármol; Gerald S. Buller; S.D. Cova; S Tisa; P.D. Townsend. Available on-line at: <<http://www.physics.ucc.ie/ETOS/Abstracts/TownsendP/PT.pdf>>.

- 41 Title of the work:** A quantum key distribution system operating at gigahertz clock rates
Name of the conference: CLEO (Conference on Lasers and Electro-Optics)
Type of event: Conference **Geographical area:** European Union
Type of participation: 'Participatory - poster
City of event: San Francisco, United States of America
Date of event: 18/05/2004
End date: 20/05/2004
K.J. Gordon; Verónica Fernández Mármol; Gerald S. Buller; P.D. Townsend; S.D. Cova.

- 42 Corresponding author:** Yes
Alfonso Blanco Blanco; Veronica Fernandez; Andres Ruiz Chamorro. "Impairments Optimization for Continuous-Variable Quantum Key Distribution".

Works submitted to national or international seminars, workshops and/or courses

- 1 Title of the work:** Multiprotocol QKD Nodes Implemented With Integrated Electronic and Photonic Devices
Name of the event: QCRYPT 2024
Type of event: Workshop
Corresponding author: No
Geographical area: National
City of event: Vigo, Community of Madrid, Spain
Date of event: 02/09/2024
End date: 06/09/2024
Organising entity: University of Vigo
Type: Scientific paper
Daniel Balado Souto; Adrián Llanos Velasco; Verónica Fernández Mármol. "Multiprotocol QKD Nodes Implemented With Integrated Electronic and Photonic Devices".
- 2 Title of the work:** PILOT TONE-ASSISTED FREQUENCY LOCKING IN LOW-COMPLEXITY CV-QKD SYSTEMS
Name of the event: QCRYPT 2024
Type of event: Workshop
Corresponding author: No
Geographical area: National
City of event: Vigo, Community of Madrid, Spain
Date of event: 02/09/2024
End date: 06/09/2024
Organising entity: University of Vigo
Type: Scientific paper
Andrés Ruiz Chamorro; Aida García Callejo; Verónica Fernández Mármol. "PILOT TONE-ASSISTED FREQUENCY LOCKING IN LOW-COMPLEXITY CV-QKD SYSTEMS".
- 3 Title of the work:** Comparative Analysis of Hybrid Quantum Error Correction (QEC)-Quantum Key Distribution (QKD) Protocols: Technical Considerations, Efficiency and Feasibility.
Name of the event: QCRYPT 2023
Type of event: Workshop



Corresponding author: No

Geographical area: National

City of event: Washington, United States of America

Date of event: 14/08/2023

End date: 18/08/2023

Organising entity: University of Maryland

Type: Scientific paper

Aida García Callejo; Andrés Ruiz Chamorro; Pablo Arteaga Diaz; Daniel Cano Reol; Verónica Fernández Mármol.

- 4** **Title of the work:** Comunicaciones ópticas/cuánticas en la atmosfera
Name of the event: Jornada sobre COMUNICACIONES Y REDES CUÁNTICAS: ESTADO DE DESARROLLO Y APLICACIONES EN EL ÁMBITO DE LA DEFENSA Y LA SEGURIDAD
Type of event: Workshop
Corresponding author: Yes
Geographical area: National
City of event: Madrid, Community of Madrid, Spain
Date of event: 15/12/2021
Organising entity: FUNDACIÓN CÍRCULO DE TECNOLOGÍAS PARA LA DEFENSA Y LA SEGURIDAD
City organizing entity: Madrid, Community of Madrid, Spain
Type: Scientific paper
Verónica Fernández Mármol. Available on-line at: <https://fundacioncirculo.azurewebsites.net/wp-content/uploads/2021/12/ComunicacionesCuanticas-.pdf>.
- 5** **Title of the work:** Soluciones ante las nuevas ciberamenazas: criptografía cuántica.
Name of the event: Jornada técnica "Telecomunicaciones y Ciberseguridad cuántica y post cuántica"
Corresponding author: Yes
Date of event: 27/05/2021
Organising entity: APTIE
Verónica Fernández Mármol. Available on-line at: <https://ptedisruptive.es/jornada-las-telecomunicaciones-y-la-ciberseguridad-cuantica-y-postcuantica/>.
- 6** **Title of the work:** La seguridad de la información ante las nuevas amenazas: criptografía cuántica
Name of the event: ENCUENTRO SOBRE CIBERSEGURIDAD Y PROTECCION DE DATOS
Type of event: Workshop
Corresponding author: Yes
Geographical area: National
City of event: Extremadura, Spain
Date of event: 26/05/2021
Organising entity: FUNDECYT_PCTEX Extremadura
Type: Scientific paper
Verónica Fernández Mármo. Available on-line at: <https://www.youtube.com/watch?v=i3G65zKEEnmo>.
- 7** **Title of the work:** Quantum cryptography
Name of the event: Quantum and Post-Quantum Cryptography
Type of event: Workshop
Corresponding author: Yes
Geographical area: National
City of event: Barcelona, Catalonia, Spain
Date of event: 24/03/2021
Organising entity: Quantum Barcelona



Type: Scientific paper

Verónica Fernández Mármol. Catalonia (Spain): Available on-line at:
<<https://www.youtube.com/watch?app=desktop&v=RvZOmCvUyA>>.

- 8** **Title of the work:** Panorama actual de las tecnologías Cuánticas. Aplicaciones reales. "Aire"
Name of the event: Jornada de Tecnologías Cuánticas dirigida al sector de defensa "Quantum Technologies" en la Academia Central de la Defensa
Corresponding author: Yes
Geographical area: National
City of event: Madrid, Community of Madrid, Spain
Date of event: 12/09/2019
Organising entity: Academia Central de la Defensa y Eurecat Centre Tecnològic de Catalunya
City organizing entity: Madrid, Community of Madrid, Spain
Verónica Fernández Mármol. Community of Madrid (Spain): Available on-line at:
<<https://www.aptie.es/cuantica-agenda/>>.

- 9** **Title of the work:** Double-loop tilt correction for robust free-space QKD
Name of the event: First International conference on Quantum Information Science
Type of event: Poster
Corresponding author: Yes
Geographical area: Non EU International
City of event: Utica (New York), United States of America
Date of event: 08/07/2019
End date: 11/07/2019
Organising entity: Laboratorio de Investigacion de la Fuerza Aérea Norteamericana (Air Force Research Laboratory) **Type of entity:** R&D Centre
City organizing entity: Utica (New York), United States of America
Verónica Fernández Mármol.

- 10** **Title of the work:** Enabling QKD under Strong Turbulence for Wireless Networks with Tilt Wavefront Correction
Name of the event: 21st International Conference on Transparent Optical Networks (ICTON)
Type of event: Conferencia Internacional
Corresponding author: Yes **Reasons for participation:** Speaker
Geographical area: European Union
City of event: Angers, France
Date of event: 08/07/2019
End date: 11/07/2019
City organizing entity: Paris, France
Publication in conference proceedings: Yes
Type: Scientific paper
Pablo Arteaga Díaz; Alejandro Ocampos Guillén; Verónica Fernández Mármol. "IEEE". (France): Available on-line at: <<https://doi.org/10.1109/icton.2019.8840410>>. ISBN 9781728127798
DOI: 10.1109/ICTON.2019.8840410

- 11** **Name of the event:** 5th EDA Technology Foresight Workshop
Type of event: Workshop
Geographical area: Non EU International
City of event: Bruselas, Belgium
Date of event: 23/05/2019
End date: 24/05/2019



Organising entity: Agencia Europea de Defensa **Type of entity:** State agency
City organizing entity: Bruselas, Belgium
Verónica Fernández Mármol.

- 12** **Title of the work:** Quantum Technologies: the future is now
Name of the event: Charla invitada
Corresponding author: Yes
Date of event: 08/05/2019
Organising entity: SECPHO
Available on-line at:
<<http://www.secpo.org/actoagenda/workshop-quantum-technologies-in-spain-the-future-is-now/>>.
- 13** **Title of the work:** Computación Cuántica vs Criptografía Cuántica: Amenazas y soluciones a la seguridad de la información actual
Name of the event: Computación Cuántica o cómo revolucionar los negocios de hoy.
Type of event: Seminar
Geographical area: National
City of event: Logroño, La Rioja, Spain
Date of event: 16/11/2017
Organising entity: Centro Tecnológico de la Rioja (ThinkTIC)
City organizing entity: Logroño, La Rioja, Spain
Type: Popular science article
La Rioja (Spain): 11/2017, Available on-line at: <<http://www.larioja.com/economia/economia-riojana/computacion-cuantica-pasa-20171126004815-ntvo.html>; <http://www.innovarioja.tv/index.php/video/ver/1769>>.
- 14** **Title of the work:** Computación Cuántica vs Criptografía Cuántica: La batalla futura por la seguridad de la información
Name of the event: Jornadas: Semana de la Ciencia (2 días 2 horas cada día)
City of event: Madrid, Community of Madrid, Spain
Date of event: 16/11/2016
End date: 17/11/2016
Organising entity: Instituto de Tecnologías Físicas y **Type of entity:** Public Research Body de la Información (ITEFI), CSIC,
City organizing entity: Madrid, Community of Madrid, Spain
Verónica Fernández Mármol.
- 15** **Title of the work:** La amenaza del ordenador cuántico a la seguridad actual y qué podemos hacer para evitarlo
Name of the event: Jornadas: Semana de la Ciencia (2 días 2 horas cada día)
Type of event: Workshop
City of event: Madrid, Community of Madrid, Spain
Date of event: 03/11/2015
End date: 04/11/2015
Organising entity: Instituto de Tecnologías Físicas y **Type of entity:** Public Research Body de la Información (ITEFI), CSIC
City organizing entity: Madrid, Community of Madrid, Spain
Type: Popular science article
Verónica Fernández Mármol.

- 16** **Title of the work:** ¿Está nuestra información segura ante la llegada del ordenador cuántico? Criptografía cuántica, la criptografía del futuro
Name of the event: Jornadas: Semana de la Ciencia (2 días 2 horas cada día)
Type of event: Workshop
City of event: Madrid, Community of Madrid, Spain
Date of event: 12/11/2014
End date: 13/11/2014
Organising entity: Instituto de Tecnologías Físicas y **Type of entity:** Public Research Body de la Información (ITEFI), CSIC
City organizing entity: Madrid, Community of Madrid, Spain
Type: Popular science article
Verónica Fernández Mármol.
- 17** **Title of the work:** ¿Estamos preparados para el ordenador cuántico? Criptografía cuántica, la criptografía del futuro
Name of the event: Jornadas: Semana de la Ciencia (2 días 2 horas cada día)
Type of event: Workshop
City of event: Madrid, Community of Madrid, Spain
Date of event: 13/11/2013
End date: 14/11/2013
Organising entity: Instituto de Tecnologías Físicas y **Type of entity:** Public Research Body de la Información (ITEFI), CSIC
City organizing entity: Madrid, Community of Madrid, Spain
Type: Popular science article
Verónica Fernández Mármol.

Science Outreach activities

- 1** **Title of the work:** Moderación mesa redonda
Name of the event: 1ª Jornada sobre Creatividad e Innovación
Type of event: Jornada
City of event: Madrid, Community of Madrid, Spain
Date of event: 21/04/2023
Organising entity: FUNDACION GENERAL CSIC
Available on-line at: <<https://www.youtube.com/watch?app=desktop&v=jllSdaPApTg>>.
- 2** **Title of the work:** Participación en Mesa Redonda
Name of the event: COMUNICACIONES Y REDES CUÁNTICAS ESTADO DE DESARROLLO Y APLICACIONES EN EL ÁMBITO DE LA DEFENSA Y LA SEGURIDAD
Type of event: Jornada
City of event: Madrid, Community of Madrid, Spain
Date of event: 15/01/2021
Organising entity: FUNDACIÓN CÍRCULO DE TECNOLOGÍAS PARA LA DEFENSA Y LA SEGURIDAD
- 3** **Title of the work:** Charla TEDx
Name of the event: Jornada RETROFUTURO
Corresponding author: Yes
City of event: Madrid, Community of Madrid, Spain
Date of event: 21/09/2019
Organising entity: TEDxMadrid 2019. **Type of entity:** Associations and Groups
RETROFUTURO



City organizing entity: Madrid, Community of Madrid, Spain

Verónica Fernández Mármol. Available on-line at: <<https://www.facebook.com/tedxmadrid/videos/425335728092962/UzpfSTYyODkxNDYyNDoxMDE1ODM4NDI3MTM0NDYyNQ/>>.

4 Title of the work: Distribución Cuántica de Claves: Implementación y Retos

Name of the event: CIBERWALL

Geographical area: Regional

Corresponding author: Yes

City of event: Ávila, Castile and León, Spain

Date of event: 18/07/2019

Organising entity: Escuela Nacional de Policía **Type of entity:** Escuela Nacional de Policía

City organizing entity: Avila, Castile and León, Spain

Verónica Fernández Mármol. Castile and León (Spain): Available on-line at:

<<https://www.youtube.com/watch?v=yF2c79bE5n0&feature=youtu.be&app=desktop>>.

5 Title of the work: Tecnologías emergentes y privacidad

Name of the event: Mañana empieza hoy

Type of event: Participacion en Mesa Redonda **Geographical area:** Regional

Reasons for participation: Upon invitation

Corresponding author: Yes

City of event: Madrid, Community of Madrid, Spain

Date of event: 12/06/2019

Organising entity: IFEMA **Type of entity:** Business

City organizing entity: Madrid, Community of Madrid, Spain

Verónica Fernández Mármol. Community of Madrid (Spain): Available on-line at:

<<https://www.mananaempiezhoy.es/eventos/tecnologias-emergentes-y-privacidad/>>.

6 Title of the work: La Física Cuántica para guardar nuestros secretos.

Name of the event: Día de la Niña y la Mujer en la ciencia en el Colegio Público San Ramón y San Antonio

Type of event: Seminario **Geographical area:** Regional

Corresponding author: Yes

City of event: Madrid, Community of Madrid, Spain

Date of event: 13/02/2019

Organising entity: Colegio Público San Ramón y San Antonio

City organizing entity: Madrid, Community of Madrid, Spain

Verónica Fernández Mármol. Available on-line at: <<https://www.youtube.com/watch?v=i8xrA4ehp6Q>>.

7 Title of the work: Promover las STEM (Science, Technology, Engineering and Science) en niñas

Name of the event: Campamento de Verano Smartick

Type of event: Fairs and exhibitions

City of event: Madrid, Community of Madrid, Spain

Date of event: 05/07/2018

Organising entity: Smartick

City organizing entity: Madrid, Community of Madrid, Spain

Verónica Fernández Mármol. Community of Madrid (Spain): Available on-line at:

<<https://www.madrimasd.org/notiweb/noticias/mayor-quiero-ser-astrofisica>>.

8 Title of the work: Estereotipos de genero en los niños

Geographical area: National

City of event: Madrid, Community of Madrid, Spain

Date of event: 23/05/2018



Organising entity: Periodico El Pais

City organizing entity: Madrid, Community of Madrid, Spain

Verónica Fernández Mármol. Community of Madrid (Spain): Available on-line at: <Organización y participación en un vídeo y reportaje de El País sobre los estereotipos de género en los niños: https://elpais.com/economia/2018/05/22/actualidad/1527002625_327491.html>.

9 Title of the work: Usando la luz para la protección de la información

Name of the event: Finde Científico. FECYT

Type of event: Fairs and exhibitions

Geographical area: National

City of event: Alcobendas (Madrid), Community of Madrid, Spain

Date of event: 13/05/2018

Organising entity: Fundación Española para la Ciencia y la Tecnología. FECYT

Type of entity: Foundation

City organizing entity: Alcobendas (Madrid), Community of Madrid, Spain

Verónica Fernández Mármol; Natalia Denisenko. Available on-line at: <<https://findecientifico.fecyt.es/>>.

10 Title of the work: Niñas sin límites. Ciencia del futuro

Name of the event: La motivación de las niñas en carreras científicas o

Type of event: Evento de motivación

Geographical area: National

City of event: Madrid, Community of Madrid, Spain

Date of event: 07/02/2018

Organising entity: Fundación Inspiring girls

Type of entity: Foundation

City organizing entity: Madrid, Community of Madrid, Spain

Verónica Fernández Mármol. Community of Madrid (Spain): Available on-line at: <<http://www.rtve.es/alcanta/videos/telediario/favor-ciencia-hecha-mujeres-contra-brecha-genero/4467048/>>.

11 Title of the work: Ellas son el CSIC, para la visibilización de la mujer en las carreras científicas

Geographical area: National

City of event: Madrid, Community of Madrid, Spain

Date of event: 15/01/2018

City organizing entity: Madrid, Community of Madrid, Spain

Verónica Fernández Mármol. Community of Madrid (Spain): Available on-line at: <<http://www.publico.es/sociedad/ellasoncsic-csic-lanza-iniciativa-visibilizar-mujeres-ciencia.html>>.
<<https://twitter.com/twitter/statuses/952857425715089408>>.>

12 Title of the work: Entrevista para la revista Science

Type of event: Media interviews

Date of event: 15/06/2017

Verónica Fernández Mármol. Available on-line at: <<http://www.sciencemag.org/news/2017/06/china-quantum-satellite-achieves-spooky-action-record-distance>>.

13 Title of the work: Jornada de visita de alumnos de la ESO para Proyecto 4º de la ESO + Empresa

Name of the event: Jornada de visita de alumnos de la ESO para Proyecto 4º de la ESO + Empresa

Type of event: Jornada de visita de alumnos de la ESO

City of event: Madrid, Community of Madrid, Spain

Date of event: 16/03/2016

Organising entity: Consejería de Educación y Deporte de la Comunidad de Madrid

City organizing entity: Madrid, Community of Madrid, Spain

Verónica Fernández Mármol.



- 14** **Title of the work:** Aparición en el programa Oficiorama de la TVE-2
Geographical area: National
City of event: Madrid, Community of Madrid, Spain
Date of event: 02/2016
Organising entity: TVE-2 **Type of entity:** Televisión
City organizing entity: Madrid, Community of Madrid, Spain
Verónica Fernández Mármol. Available on-line at:
<<http://www.rtve.es/alacarta/videos/oficiorama/oficiorama-programa-1/3485799/>>.
- 15** **Title of the work:** Entrevista concedida a Juan José García Ripoll para RICE
Name of the event: Quantum Information Network in Spain
City of event: Madrid, Community of Madrid, Spain
Date of event: 07/10/2015
City organizing entity: Madrid, Community of Madrid, Spain
Verónica Fernández Mármol. Available on-line at:
<<http://rice.hbar.es/research/articles/interview-veronica-fernandez-marmol>>.
- 16** **Title of the work:** Jornada de visita de alumnos de la ESO para Proyecto 4º de la ESO + Empresa
Name of the event: Jornada de visita de alumnos de la ESO para Proyecto 4º de la ESO + Empresa
Type of event: Jornada de visita de alumnos de la ESO
City of event: Madrid, Community of Madrid, Spain
Date of event: 23/03/2015
Organising entity: Consejería de Educación y Deporte de la Comunidad de Madrid
City organizing entity: Madrid, Community of Madrid, Spain
Verónica Fernández Mármol.

R&D management and participation in scientific committees

Scientific, technical and/or assessment committees

- 1** **Committee title:** Moderadora de la jornada “Working Group 3 on quantum technologies” organizada CRIQUE (Circle of Research and Innovation Quebec-Europe)
Affiliation entity: CRIQUE
Start date: 02/12/2021
- 2** **Committee title:** Miembro del comité del programa científico para QCRYPT 2021.
Geographical area: Non EU International
City: Ámsterdam, Holland
Affiliation entity: QCRYPT
City affiliation entity: Ámsterdam, Holland
Start date: 15/04/2021
- 3** **Committee title:** Coordinadora de la Plataforma Temática Interdisciplinar del CSIC Tecnologías Cuánticas (QTEP).
Geographical area: Non EU International
City: Madrid, Community of Madrid, Spain
Affiliation entity: Consejo Superior de Investigaciones Científicas **Type of entity:** State agency
City affiliation entity: Madrid, Community of Madrid, Spain



- 4** **Committee title:** Joint Board on Communication Satellite Programs (JCB) Scylight Optical communication advisory Committee
Affiliation entity: AGENCE SPATIALE EUROPEENE ESA - ESAC
- 5** **Committee title:** Miembro del comité organizador del evento Quantum Information Spain (ICE) 2021.
Geographical area: National
City: Madrid, Community of Madrid, Spain
City affiliation entity: Madrid, Community of Madrid, Spain
- 6** **Committee title:** Miembro del comité organizador del evento Quantum Information Spain (ICE) 2021.
Geographical area: National
City: Madrid, Community of Madrid, Spain
Affiliation entity: RITCE
City affiliation entity: Madrid, Community of Madrid, Spain

Organization of R&D activities

- 1** **Title of the activity:** Organización Quantum Technologies for Defence and Security II
Type of activity: Científica/tecnológica **Geographical area:** European Union
Convening entity: SPIE
City convening entity: Madrid, Community of Madrid, Spain
Start-End date: 15/09/2025 - 18/09/2025
- 2** **Title of the activity:** Organización jornada Industrial Day de ICE2021
Type of activity: Científica/tecnológica **Geographical area:** European Union
Convening entity: RITCE
City convening entity: Madrid, Community of Madrid, Spain
Start-End date: 14/05/2021 - 14/05/2021
- 3** **Title of the activity:** Gestión y redacción de la propuesta de Plataforma Temática Interdisciplinar "Quantum Technologies"
Type of activity: Plan estratégico CSIC 2018-2021 **Geographical area:** National
City of event: madrid, Community of Madrid, Spain
Convening entity: Consejo Superior de Investigaciones Científicas **Type of entity:** State agency
City convening entity: Madrid, Community of Madrid, Spain
Type of participation: Organiser
Start date: 15/06/2018

R&D management

- 1** **Name of the activity:** Gestión Grupo de Investigación Criptografía y Seguridad de la Información
Type of management: Group management
Performed tasks: Representante del grupo de investigación ante la dirección de mi instituto y otros organismos institucionales
Entity: Instituto de Tecnologías Físicas y de la Información
Start date: 03/02/2023



- 2 Name of the activity:** Coordinación Plataforma Temática Interdisciplinar Quantum Technologies QTEP
Type of management: Management of body
Performed tasks: coordinación de las actividades de los distintos grupos de investigación que la componen así como desempeño de actividades de representación en actividades institucionales
Entity: CSIC **Type of entity:** Plataforma Temática Interdisciplinar del CSIC
Start date: 01/02/2021

National and international forums and committees

- 1 Name of the forum:** European Thematic Working Groups
Professional category: national point of contact
Organising entity: European Commission
Start date: 01/12/2024
- 2 Name of the forum:** grupo de estandarización CTN71/SC14 en Tecnologías Cuánticas
Professional category: Vocal
Organising entity: ASOCIACION ESPAÑOLA DE NORMALIZACION Y CERTIFICACION

Evaluation and revision of R&D projects and articles

- 1 Name of the activity:** Verónica
Performed tasks: Evaluación proyectos europeos
Entity where activity was carried out: Comisión Europea **Type of entity:** Institución gubernamental
City of entity: Madrid, Community of Madrid, Spain
Start-End date: 21/09/2022 - 05/11/2025
- 2 Name of the activity:** Proyectos de Generación de Conocimiento 2021. Investigación Orientada Tipo B
Performed tasks: Evaluación de la calidad científico técnica de propuestas científicas
Entity where activity was carried out: Agencia Estatal de Investigación
Start-End date: 04/02/2022 - 19/02/2022
- 3 Name of the activity:** Evaluación ayudantes y técnicos 2021
Performed tasks: Evaluación de la calidad de las propuestas científicas ayudantes y técnicos 2021
Entity where activity was carried out: Comunidad de Madrid **Type of entity:** Consejería de ciencia, universidades e innovación
City of entity: madrid, Community of Madrid, Spain
Start-End date: 21/01/2022 - 07/02/2022
- 4 Name of the activity:** Revisión manuscrito para Optics Express
Performed tasks: Revisión por pares
Entity where activity was carried out: Optica Publishing Group
Type of activity: Review of articles in scientific or technological journals
Geographical area: Non EU International
Start-End date: 27/02/2020 - 11/03/2020



- 5** **Performed tasks:** Revisión por pares, publicada por la Optical Society of America
Entity where activity was carried out: Optical Society of America. Revista Optics Letters; number: 1539-4794 (online)
Type of activity: Review of articles in scientific or technological journals
Geographical area: Non EU International
Start date: 18/06/2018
- 6** **Performed tasks:** Revisión por pares, open access, publicada por Nature Publishing Group
Entity where activity was carried out: Revista: Scientific Reports; number: 2045-2322
Type of activity: Review of articles in scientific or technological journals
Start date: 06/02/2017
- 7** **Performed tasks:** Revisión por pares, publicada por la Optical Society of America
Entity where activity was carried out: Optical Society of America. Revista Optics Express; number: 1094-4087
Type of activity: Review of articles in scientific or technological journals
Geographical area: Non EU International
Start date: 10/12/2016
- 8** **Name of the activity:** Revisión Artículo Científico
Performed tasks: Revisión por pares, en formato electrónico y open access. Revista Nova Scientia
Entity where activity was carried out: Universidad De La Salle Bajío **Type of entity:** University
City of entity: León, Mexico
Geographical area: Non EU International
Start date: 30/10/2013
- 9** **Performed tasks:** Revisión Artículo Científico.
Entity where activity was carried out: Sociedad Española de Óptica. Revista: Óptica Pura y Aplicada
Type of activity: Review of articles in scientific or technological journals
Start date: 08/10/2013

Other achievements

Stays in public or private R&D centres

- 1** **Entity:** Ludwig Maximilians Universitat **Type of entity:** University
City of entity: Munich, Germany
Start-End date: 30/06/2010 - 30/07/2010 **Duration:** 1 month
City funding entity: Munich, Germany
Name of programme: Criptografía cuántica a través del espacio libre
Goals of the stay: Guest
Provable tasks: proyecto bilateral de movilidad, código PA1002713)
- 2** **Entity:** QinetiQ
City of entity: Great Malvern, United Kingdom
Start-End date: 11/05/2009 - 11/08/2009 **Duration:** 3 months
Name of programme: Transmisión cuántica de claves a través del espacio libre
Goals of the stay: Guest



Provable tasks: proyecto bilateral de movilidad, código PA1002110

- 3** **Entity:** Universidad Heriot-Watt **Type of entity:** University
City of entity: Edimburgo, United Kingdom
Start-End date: 11/05/2006 - 11/09/2007 **Duration:** 1 year - 4 months
Name of programme: Sistemas de encriptación mediante distribución de clave cuántica
Goals of the stay: Post-doctoral

Obtained grants and scholarships

- 1** **Name of the grant:** Personal Técnico de Garantía Juvenil en el marco del Programa Operativo Empleo Juvenil 2014-2020
Aims: Pre-doctoral
Awarding entity: Consejo Superior de Investigaciones Científicas **Type of entity:** State agency
Conferral date: 02/10/2017 **Duration:** 1 year
End date: 01/10/2018
Entity where activity was carried out: Consejo Superior de Investigaciones Científicas
Faculty, institute or centre: Centro de Tecnologías Físicas Leonardo Torres Quevedo
- 2** **Name of the grant:** American Universities Internships in Science Research and Engineering Spain
Aims: prácticas universitarias internacionales
Awarding entity: OléSAY **Type of entity:** Business
Conferral date: 05/02/2018 **Duration:** 2 months - 22 days
End date: 27/04/2018
Entity where activity was carried out: Centro de Tecnologías Físicas Leonardo Torres Quevedo
- 3** **Name of the grant:** Ayudas para la contratación de Ayudantes de investigación y Técnicos de Laboratorio de la convocatoria 2015
Aims: Pre-doctoral
Awarding entity: Fondo Social Europeo y Comunidad de Madrid **Type of entity:** Public Research Body
Conferral date: 01/02/2016 **Duration:** 2 years
End date: 31/01/2018
Entity where activity was carried out: Consejo Superior de Investigaciones Científicas
Faculty, institute or centre: Centro de Tecnologías Físicas Leonardo Torres Quevedo
- 4** **Name of the grant:** Beca Vodafone
Aims: Pre-doctoral
Awarding entity: IEE (Institute of Electrical Engineers)
Conferral date: 11/2003



Prizes, mentions and distinctions

- 1** **Description:** Primer premio del II Hackathon del CSIC para la búsqueda de soluciones científicas para la sociedad (EBTON)
Awarding entity: Jurado compuesto por VIT (CSIC) y la empresa organizadora "¿Por qué no?"
City awarding entity: Madrid
Conferral date: 17/04/2023
- 2** **Description:** Premio Thales Scottish Technology Prize
Awarding entity: Thales UK y Scottish Enterprise
City awarding entity: United Kingdom
Conferral date: 12/2008
- 3** **Description:** Premio anual a la mejor tesis de la Escuela de Ingeniería y Ciencias Físicas
Awarding entity: Universidad Heriot-Watt
City awarding entity: Edimburgo, United Kingdom
Conferral date: 09/2006