Grupo de investigación en Información y Computación Cuántica

Características generales | Características del Equipo de Investigación | Características de la Investigación

IDENTIFICACIÓN DEL EQUIPO INVESTIGADOR

NOMBRE DEL EQUIPO O GRUPO DE INVESTIGACIÓN	Grupo de investigación en Información y Computación Cuántica
UNIDAD/DEPARTAMENTO DE PERTENENCIA	Escuela Técnica Superior de Ingenieros Informáticos/ Departamento de Lenguajes y Sistemas Informáticos e Ingeniería de Software / Universidad Politécnica de Madrid
CENTRO/INSTITUTO/UNIVERSIDAD/ORGANISMO DE PERTENENCIA	Centro para la Simulación Computacional (CCS)

DATOS DE CONTACTO

DATOS DE CONTACTO DEL EQUIPO

PERSONA DE CONTACTO	Vicente Martín Ayuso	TELÉFONO	
ROL EN EL EQUIPO	Catedrático de Universidad /directore del CCS	MAIL	vicente@fi.upm.es
WEB DEL EQUIPO	http://www.gcc.fi.upm.es/		

DIRECCIÓN POSTAL DEL EQUIPO

EDIFICIO	Bloque V	CENTRO	Escuela Técnica Superior de Ingenieros Informáticos
TIPO DE VÍA		NOMBRE DE LA VÍA	Campus de Montegancedo
NÚMERO		CIUDAD	Boadilla del Monte
PROVINCIA	Madrid	CÓDIGO POSTAL	E28660

DATOS DE CONTACTO DEL ORGANISMO AL QUE PERTENECE

PERSONA DE CONTACTO	Vicente Martín Ayuso
MAIL	vicente@fi.upm.es
TELÉFONO	
WEB	

DIRECCIÓN POSTAL DEL ORGANISMO

EDIFICIO	Bloque V	CENTRO	Escuela Técnica Superior de Ingenieros Informáticos
TIPO DE VÍA		NOMBRE DE LA VÍA	Campus de Montegancedo
NÚMERO		CIUDAD	Boadilla del Monte
PROVINCIA	Madrid	CÓDIGO POSTAL	E28660

Grupo de investigación en Información y Computación Cuántica

Características generales | **Características del Equipo de Investigación** | Características de la Investigación

INVESTIGADOR PRINCIPAL

NOMBRE	TITULACIÓN
Vicente Martín Ayuso	Ph.D /Catedrático de Universidad

TRAYECTORIA PROFESIONAL

Prof. Vicente Martín, (M) Full Professor of Computational Science at Universidad Politécnica de Madrid. Ph.D. Physics U. Autónoma de Madrid on the numerical simulation of quantum systems. His main research interest is in the practical deployment of QKD in networks. He was a founding member of the Specialized Group in Quantum Information and Computing of the Spanish Royal Society of Physics and also of the Industry Specification Group on Quantum Key Distribution at the European Telecommunications Standadards Institute, where he is currently vicechair. He has participated in more than 26 projects (including 8 in FP7 and H2020) leading 21 of them. He also leaded the quantum cryptography sections of the CENIT Segur@ project, QUITEMAD, QUITEMAD+ and QUITEMAD-CM consortia, four of the biggest projects related to QKD and networks in Spain. He currently coordinates the Quantum Information and Computation Group (GIICC) at the Center for Computational Simulation (CCS) and leads the network WPs of a Quantum flagship (CiViQ) and the Quantum Communications (OpenQKD) EU projects and participated in the EuroQCI design project QCI4EU. He has been the coordinator at UPM for the different Quantum network prototypes at Madrid, built together with Telefónica research, and is the responsible of the current Madrid Quantum Network in the OpenQKD project. He was Director of CeSViMa (Madrid Supercomputing and Visualization Center) from 2011 to 2015. Currently is the director of the UPM Center for Computational Simulation.

WEB Y REDES SOCIALES

http://www.gcc.fi.upm.es/

MIEMBROS DEL EQUIPO

Brito Méndez Juán Pedro, Ph.D.	Ortiz Martín, Laura. Ph.D	Rosales Bejarano, Jose Luis Ph. D.
Brito Méndez, Ruben David	Rivas Vargas, Pilar	Juan Vicente, Rafael
Sáez de Buruaga Brouns, Jaime	Juan Sebastián, Alberto	Artiñano Muñoz, Rafael
Martín Ayuso, Vicente, Ph.D.	Pedro Salas Peralta, Ph.D.	Julio Setién

Grupo de investigación en Información y Computación Cuántica		
Características generales	Características del Equipo de Investigación	Características de la Investigación

LÍNEAS Y ÁREAS DE INVESTIGACIÓN	
ÁREAS DE INVESTIGACIÓN	**PRINCIPALES LÍNEAS DE INVESTIGACIÓN**
OTRAS	Criptografía Cuántica, Distriibución Cuántica de Claves (QKD) Integracion de QKD en redes de comunicaciones, Comunicaciones cuánticas Simulación Cuántica
INFRAESTRUCTURAS CRÍTICAS	Monitorizado y seguridad de redes Arquitecturas resilientes
ÁREAS DE INTERÉS	Seguridad de redes Virtualización y gestión de redes
SISTEMAS FIABLES Y ACTUALIZABLES	Computación Segura

PUBLICACIONES RELACIONADAS DESTACADAS

PUBLICACIONES AÑO 2021

J.L. Rosales, S. Briongos, and V. Martín. "Quantum Chaos and the Spectrum of Factoring", Advanced Quantum Technologies 22 January 2021 https://doi.org/10.1002/qute.202000086

PUBLICACIONES AÑO 2020

A. Aguado, D. R. Lopez, A. Pastor, V. Lopez, J. P. Brito, M. Peev, A. Poppe and V. Martin, "Quantum Cryptography Networks Supporting Path Verification in Service Function Chains," IEEE/OSA Journal of Optical Communications and Networking, vol. 12, no. 4, pp. B9-B19, 2020 (IEEE [cs.IT], DOI https://doi.org/10.1364/JOCN.379799).

A. N. Pinto, L. Ortiz, M. Santos, A. C. Gomes, J. P. Brito, N. J. Muga, N. A. Silva , P. Mateus, and V. Martin, "Quantum enabled private recognition of composite signals in genome and proteins", Proceedings of the 2021 22nd International Conference on Transparent Optical Networks (ICTON), DOI 10.1109/ICTON51198.2020.9203181

R.R. Lopez, V. Martin, V. Lopez, F. de la Iglesia, A. Pastor, H. Brunner, A. Aguado, S. Bettelli, F. Fung, D. Hillerkuss, L. Comandar, D. Wang, A. Poppe, J.P Brito, P.J. Salas and M. Peev, "Demonstration of Software Defined Network Services Utilizing Quantum Key Distribution Fully Integrated with Standard Telecommunication Network", Quantum Reports 2020, 2(3), 453-458; https://doi.org/10.3390/quantum2030032

V. Martin; D. Lopez; A. Aguado; J. P. Brito; J. Setien; P. Salas; C. Escribano; V. Lopez; A. Pastor-Perales; M. Peev, "A Components Based Framework for Quantum Key Distribution Networks", Proceedings of the 2021 22nd International Conference on Transparent Optical Networks (ICTON), DOI 10.1109/ICTON51198.2020.9203181, DOI 10.1109/ICTON51198.2020.9203181

A. Aguado, D. R. López, A. Pastor, V. López, J. P. Brito, M. Peev, A. Poppe, and V. Martín, "Quantum cryptography networks in support of path verification in service function chains" , J. Opt. Commun. Netw. 12, B9-B19 (2020), DOI 10.1364/JOCN.379799

Ruben B. Mendez; Juan P. Brito; Rafael J. Vicente; A. Aguado; Antonio Pastor; Diego Lopez; V. Martin; Victor Lopez, "Quantum Abstraction Interface: Facilitating Integration of QKD Devices in SDN Networks" , Proceedings of the 2021 22nd International Conference on Transparent Optical Networks (ICTON), DOI 10.1109/ICTON51198.2020.9203073

PUBLICACIONES AÑO 2019

A. Aguado; V. Lopez; D. Lopez; M. Peev; A. Poppe; A. Pastor; J. Folgueira; V. Martín, "The Engineering of Software-Defined Quantum Key Distribution Networks", IEEE/Communications Magazine, vol. 57, no. 7, pp. 20-26, 2019 (IEEE [cs.IT] DOI), https://doi.org/10.1109/MCOM.2019.1800763

Victor Lopez; Antonio Pastor; Diego Lopez; Alejandro Aguado; Vicente Martin, "Applying QKD to improve next-generation network infrastructures" , Proceeding of the European Conference on Networks and Communications (EuCNC) 2019, DOI 10.1109/EuCNC.2019.8802060

A. Aguado, D. R. López, A. Pastor, V. López, J. P. Brito, M. Peev, A. Poppe, and V. Martín, Proceedings of the 21st International Conference on Transparent Optical Networks (ICTON), 2019."Quantum Aware SDN Nodes in the Madrid Quantum Network" DOI. 10.1109/ICTON.2019.8840338

V. Martin, A. Aguado, P. Salas, A.L. Sanz, J.P. Brito, D. R. Lopez, V. Lopez, A. Pastor, J. Folgueira, H. H. Brunner, S. Bettelli, F. Fung, L. C. Comandar, D. Wang, A. Poppe, and M. Peev, "The Madrid Quantum Network: A Quantum-Classical Integrated Infrastructure", OSA Technical Digest (Optical Society of America) , 2019, paper QtW3E.5, DOI 10.1364/NETWORKS.2019.QtW3E.5

J. P. Brito; D. R. López; A. Aguado; C. Abellán; V. López; A. Pastor-Perales; F. de la Iglesia; V. Martín, 21st International Conference on Transparent Optical Networks (ICTON), 2019, "Quantum Services Architecture in Softwarized Infrastructures" , DOI 10.1109/ICTON.2019.8840400

A. Aguado, D. Lopez, V. Lopez, F. de la Iglesia, A. Pastor and V. Martin, "Quantum Technologies in Support for 5G services: Ordered Proof-of-Transit," in ECOC 2019, European Conference on Optical Communication, Dublin, Irland, Sept. 22-26, 2019 (PDF PDF, BibTEX BibTEX).

A. Aguado, V. Lopez, J. Martinez-Mateo, M. Peev, D. Lopez, and V. Martin, "Virtual Network Function Deployment and Service Automation to Provide End-to-End Quantum Encryption," Journal of Optical Communications and Networking, vol. 10, no. 4, pp. 421-430, Apr. 2018, DOI https://doi.org/10.1364/JOCN.10.000421.

PUBLICACIONES AÑO 2018

J.L Rosales, V. Martín, Phys. Rev. A 97, 032325 (2018), "Quantum simulation of the integer factorization problem: Bell states in a Penning trap", DOI https://doi.org/10.1103/PhysRevA.97.032325.

A. Aguado, V. Lopez, J. Martinez-Mateo, M. Peev, D. Lopez, and V. Martin, "Virtual Network Function Deployment and Service Automation to Provide End-to-End Quantum Encryption," Journal of Optical Communications and Networking, vol. 10, no. 4, pp. 421-430, Apr. 2018, DOI https://doi.org/10.1364/JOCN.10.000421.

PUBLICACIONES AÑO 2017

A. Aguado, V. Lopez, J. Martinez-Mateo, T. Szyrkowiec, A. Autenrieth, M. Peev, D. Lopez, and V. Martin, "Hybrid Conventional and Quantum Security for Software Defined and Virtualized Networks," Journal of Optical Communications and Networking, vol. 9, no. 10, pp. 819-825, Oct. 2017 , DOI http://dx.doi.org/10.1109/JSTQE.2014.2367241

A. Aguado, V. Lopez, J. Martinez-Mateo, M. Peev, D. Lopez, and V. Martin, "GMPLS Network Control Plane Enabling Quantum Encryption in End-to-End Services," in ONDM 2017, 21th International Conference on Optical Network Design and Modeling, Budapest, Hungary, May 15-18, 2017. Best Paper Award

A. Aguado, J. Martinez-Mateo, V. Lopez, D. Lopez, M. Peev, and V. Martin, "Experimental Validation of an End-to-End QKD Encryption Service in MPLS environments," poster presented in QCrypt 2017, 7th International Conference on Quantum Cryptography, Cambridge, UK, September 18-22, 2017

PUBLICACIONES AÑO 2016

J. L. Rosales, and V. Martin, "Quantum Simulation of the Factorization Problem," Physical Review Letters, vol. 117, no. 20, p. 200502, Nov. 2016 (arXiv:1601.04896 [quant-ph]) DOI http://dx.doi.org/10.1103/PhysRevLett.117.200502,

A. Aguado, V. Martin, D. Lopez, M. Peev, J. Martinez-Mateo, J. L. Rosales, F. de la Iglesia, M. Gomez, E. Hugues-Salas, A. Lord, R. Nejabati, and D. Simeonidou, "Quantum-Aware Software Defined Networks," poster presented in QCrypt 2016, 6th international conference on quantum cryptography, September 12-16, Washington DC, USA, 2016

PUBLICACIONES AÑO 2015

A. Ciurana, V. Martin, J. Martinez-Mateo, B. Schrenk, M. Peev, and A. Poppe, "Entanglement Distribution in Optical Networks," IEEE Journal of Selected Topics in Quantum Electronics, vol. 21, no. 3, pp. 37-48, May-June 2015 (arXiv:1409.5965 [quant-ph]), DOI http://dx.doi.org/10.1109/JSTQE.2014.2367241

J. Martinez-Mateo, C. Pacher, M. Peev, A. Ciurana, and V. Martin, "Demystifying the Information Reconciliation Protocol Cascade," Quantum Information & Computation, vol. 15, no. 5&6, pp. 453-477, Apr. 2015 (arXiv:1407.3257 [quant-ph]), DOI https://dl.acm.org/doi/10.5555/2871401.2871407

A. Poppe, A. Ciurana, J. Martinez-Mateo, J.L. Rosales, B. Schrenk, M. Peev, and V. Martin, "A Novel Concept of Entanglement Distribution in Optical Networks," in CLEO/Europe-EQEC 2015, Conference on Lasers and Electro-Optics/Europe and the European Quantum Electronics Conference, June 21-25, Munich, Germany, 2015

C. Pacher, P. Grabenweger J. Martinez-Mateo, and V. Martin, "An Information Reconciliation Protocol for Secret-Key Agreement with Small Leakage," in 2015 IEEE International Symposium on Information Theory (ISIT), June 14-19, Hong Kong, pp. 730-734, 2015

C. Pacher, P. Grabenweger, J. Martinez-Mateo, and V. Martin, "An Information Reconciliation Protocol for Secret-Key Agreement with Small Leakage," poster presented in QCrypt 2015, 5th international conference on quantum cryptography, September 28-October 2, Tokyo, Japan, 2015

J. Martinez-Mateo, J. L. Rosales, and V. Martin, "Rate-Adaptive LDPC-based Key Reconciliation for High Performance Quantum Key Distribution," poster presented in QCrypt 2015, 5th international conference on quantum cryptography, September 28-October 2, Tokyo, Japan, 2015

C. Pacher, J. Martinez-Mateo, J. Duhme, F. Furrer, V. Händchen, T. Gehring, R. F. Werner, and R. Schnabel, "Efficient Information Reconciliation for Continuous-Variable QKD using Non-Binary Low-Density Parity-Check Codes," poster presented in QCrypt 2015, 5th international conference on quantum cryptography, September 28-October 2, Tokyo, Japan, 2015

PUBLICACIONES 2014

J. Martinez-Mateo, A. Ciurana, and V. Martin, "Quantum Key Distribution Based on Selective Post-Processing in Passive Optical Networks," IEEE Photonics Technology Letters, vol. 26, no. 9, pp. 881-884, May. 2014 (PDF PDF, BibTEX BibTEX, DOI).

A. Ciurana, J. Martinez-Mateo, M. Peev, A. Poppe, N. Walenta, H. Zbinden, and V. Martin, "Quantum metropolitan optical network based on wavelength division multiplexing," Optics Express, vol. 22, no. 2, pp. 1576-1593, Jan. 2014 (arXiv:1309.3923 [quant-ph], PDF PDF, BibTEX BibTEX, DOI).

PUBLICACIONES RELACIONADAS DESTACADAS

R. Alleaume, I.P. Degiovanni, A. Mink, T.E. Chapuran, N. Lutkenhaus, M. Peev, C.J. Chunnilall, V. Martin, M. Lucamarini, M. Ward, and A. Shields, "Worldwide standardization activity for quantum key distribution," in 2014 IEEE Globecom Workshops (GC Wkshps), December 8-12, Austin, TX, USA, pp. 656-661, 2014, DOI. http://dx.doi.org/10.1109/GLOCOMW.2014.7063507

A. Poppe, A. Ciurana, F. Hipp, B. Schrenk, M. Peev, J. Martinez-Mateo, and V. Martin, "Entanglement Generation and Routing in Optical Networks," in ECOC 2014, European Conference on Optical Communications, September 21-25, Cannes, France, 2014 ,http://dx.doi.org/10.1109/ECOC.2014.6964000

A. Poppe, S. Aleksic, and V. Martin, "Integration of Quantum Key Distribution in Metropolitan Area Networks," in Quantum Information and Measurement, March 18-20, Berlin, Germany, 2014, http://dx.doi.org/10.1364/QIM.2014.QW4A.6

A. Ciurana, A. Poppe, J. Martinez-Mateo, M. Peev, and V. Martin, "Entanglement Distribution in Quantum Metropolitan Optical Networks," poster presented in QCrypt 2014, 4th international conference on quantum cryptography, September 1-5, Paris, France, 2014

J. Martinez-Mateo, C. Pacher, M. Peev, A. Ciurana, and V. Martin, "Towards an Optimal Implementation of Cascade," poster presented in QCrypt 2014, 4th international conference on quantum cryptography, September 1-5, Paris, France, 2014

A. Poppe, B. Schrenk, V. Martin, and S. Aleksic, "QKD in Classic Optical Networks: Two different worlds forever?," in International Workshop on Quantum Communication Networks, January 9-10, Leeds, UK, 2014

PUBLICACIONES AÑO 2013

D. Elkouss, J. Martinez-Mateo, and V. Martin, "Analysis of a rate-adaptive reconciliation protocol and the effect of the leakage on the secret key rate," Physical Review A, vol. 87, no. 4, p. 042334, Apr. 2013 (arXiv:1304.3367 [quant-ph], DOI http://dx.doi.org/10.1103/PhysRevA.87.042334

J. Martinez-Mateo, D. Elkouss, and V. Martin, "Key Reconciliation for High Performance Quantum Key Distribution," Scientific Reports, vol. 3, no. 1576, Apr. 2013 (PDF PDF, BibTEX BibTEX, DOI).

P. J. Salas, "Security of plug-and-play QKD arrangements with finite resources," Quantum Information & Computation, vol. 13, no. 9&10, pp. 861-879, Sept. 2013 (arXiv:1304.1730 [quant-ph]).

D. Elkouss, J. Martinez-Mateo, A. Ciurana, and V. Martin, "Secure Optical Networks Based on Quantum Key Distribution and Weakly Trusted Repeaters," Journal of Optical Communications and Networking, vol. 5, no. 4, pp. 316-328, Apr. 2013 (arXiv:1304.4048 [quant-ph]) http://dx.doi.org/10.1364/JOCN.5.000316.

A. Ciurana, J. Martinez-Mateo, N. Walenta, H. Zbinden, M. Peev, A. Poppe, and V. Martin, "A Proposal for a Wavelength Multiplexed Quantum Metropolitan Area Network," poster presented in QCrypt 2013, 3rd international conference on quantum cryptography, August 5-9, Waterloo, Canada, 2013

D. Elkouss, J. Martinez-Mateo, A. Ciurana, and V. Martin, "Networks Based on QKD and Weakly Trusted Repeaters," poster presented in QCrypt 2013, 3rd international conference on quantum cryptography, August 5-9, Waterloo, Canada, 2013

PUBLICACIONES AÑO 2012

D. Elkouss, J. Martinez-Mateo, and V. Martin, "Untainted Puncturing for Irregular Low-Density Parity-Check Codes," IEEE Wireless Communications Letters, vol. 1, no. 6, pp. 585-588, Dec. 2012 (arXiv:1103.6149 [cs.IT]) DOI. http://dx.doi.org/10.1109/WCL.2012.082712.120531

J. Martinez-Mateo, D. Elkouss, and V. Martin, "Blind Reconciliation," Quantum Information & Computation, vol. 12, no. 9&10, pp. 791-812, Sept. 2012 (arXiv:1205.5729 [quant-ph], PDF PDF, BibTEX BibTEX).

A. Ciurana, V. Martin, J. Martinez-Mateo, A. Poppe, M. Soto, N. Walenta, H. Zbinden, "Multiplexing QKD systems in Conventional Optical Networks," poster presented in QCrypt 2012, 2nd international conference on quantum cryptography, September 10-14, Singapore, 2012

PUBLICACIONES AÑO 2011

D. Elkouss, J. Martinez-Mateo, and V. Martin, "Information Reconciliation for Quantum Key Distribution," Quantum Information & Computation, vol. 11, no. 3&4, pp. 226-238, Mar. 2011 (arXiv:1007.1616 [quant-ph]).

PUBLICACIONES AÑO 2010

J. Davila, D. Lancho, J. Martinez-Mateo, and V. Martin, "Hints for QKD Industrialization," in Quantum Communication Workshop 2010, February 1-2, Kjeller, Norway, 2010

D. Elkouss, J. Martinez-Mateo, D. Lancho, and V. Martin, "Information Reconciliation for Quantum Key Distribution," poster presented in UQCC 2010, Updating Quantum Cryptography and Communications, October 18-20, Tokyo, Japan, 2010

D. Lancho, J. Martinez-Mateo, D. Elkouss, A. Ciurana, M. Soto, and V. Martin, "Deploying QKD in Standard Optical Networks," poster presented in UQCC 2010, Updating Quantum Cryptography and Communications, October 18-20, Tokyo, Japan, 2010

D. Elkouss, J. Martinez-Mateo, and V. Martin, "Secure rate-adaptive reconciliation," in ISITA 2010, International Symposium on Information Theory and its Applications, October 17-20, Taichung, Taiwan, pp. 179-184, 2010 (arXiv:1007.0904), DOI http://dx.doi.org/10.1109/ISITA.2010.5650099

D. Elkouss, J. Martinez, D. Lancho, and V. Martin, "Rate Compatible Protocol for Information Reconciliation: An application to QKD," in ITW 2010, IEEE Information Theory Workshop, January 6-8, Cairo, Egypt, pp. 145-149, 2010 (arXiv:1006.2660 [cs.IT]), DOI. http://dx.doi.org/10.1109/ITWKSPS.2010.5503195

Grupo de investigación en Información y Computación Cuántica		
Redes cuánticas	Consorcio de Empresas /Universidades	Estandarización de protocolos y sistemas de Información de clave cuántica

PROYECTOS RELEVANTES
CIVIQ, Referencia: 820466, Título: Continuous Variable Quantum Communications (CiViQ), Entidad financiadora: Comisión Europea, Convocatoria: H2020-FETFLAG-2018-2020, Nombre del investigador principal: Vicente Martín Ayuso, Fecha de inicio: 01/10/2018. Fecha de finalización: 30/09/2021
Open QKD Referencia: 857156, Título: Open European Quantum Key Distribution Testbed (OPENQKD), Entidad financiadora: Comisión Europea, Convocatoria: H2020-SU-ICT-2018-2020/H2020-SU-ICT-2018-3, Nombre del investigador principal: Vicente Martín Ayuso, Fecha de inicio: 01/10/2019, Fecha de finalización: 30/09/2022
QUITEMAD-CM, Referencia: P2018/TCS-4342, Título: QUITEMAD-CM: Quantum Information Technologies Madrid, Entidad financiadora: Comunidad Autónoma de Madrid, Convocatoria: Nombre del investigador principal: Vicente Martín Ayuso, Fecha de inicio: 01/01/2019,Fecha de finalización: 31/12/2022
QCI4EU: SMART 2019/0086. STUDY ON THE SYSTEM ARCHITECTURE OF A QUANTUM COMMUNICATION INFRASTRUCTURE. Call for Tenders, Entidad Financiadora: Comisión Europea. 2021