Informação Quântica Experimental

- Investigação dos aspectos fundamentais da mecânica quântica.
- Lidar com a natureza quântica dos sistemas físicos dentro de uma teoria de informação.
- Abordagem dos processos termodinâmicos do ponto de vista da mecânica quântica.
- Desenvolvimento de emuladores quânticos: mapear problemas de difícil solução em sistemas físicos que imitem as suas hamiltonianas.
- Processadores quânticos de informação.
- Comunicação quântica: criptografia e teletransporte.
- Área multidisciplinar.

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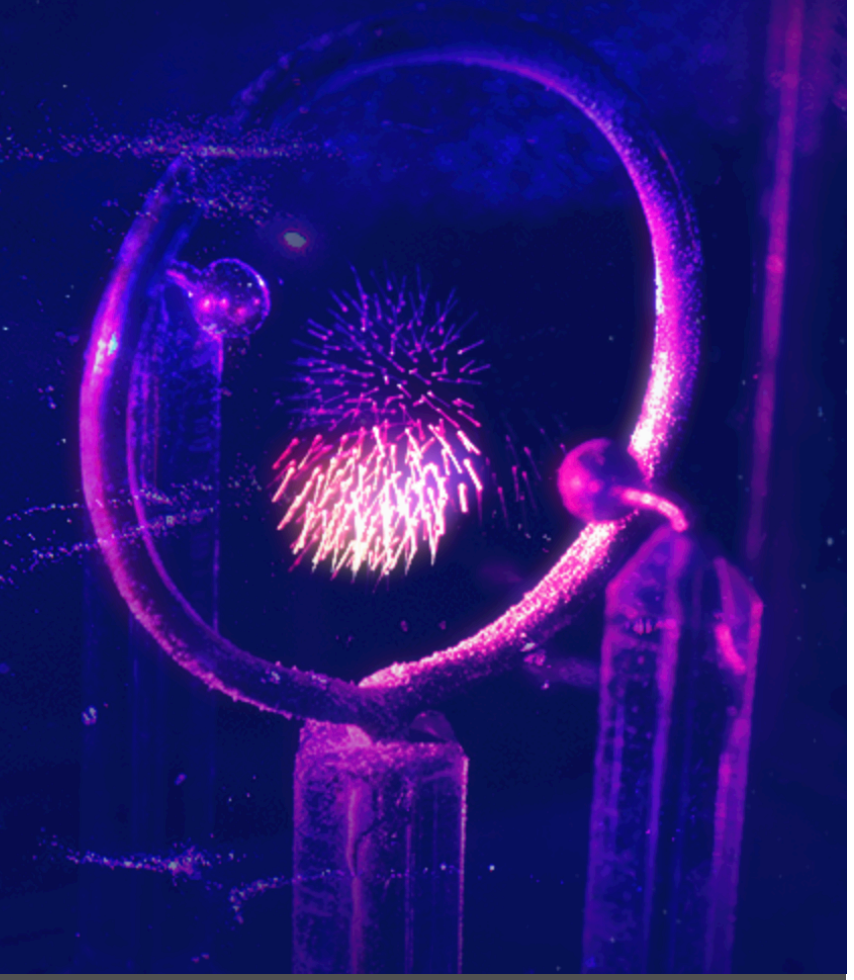


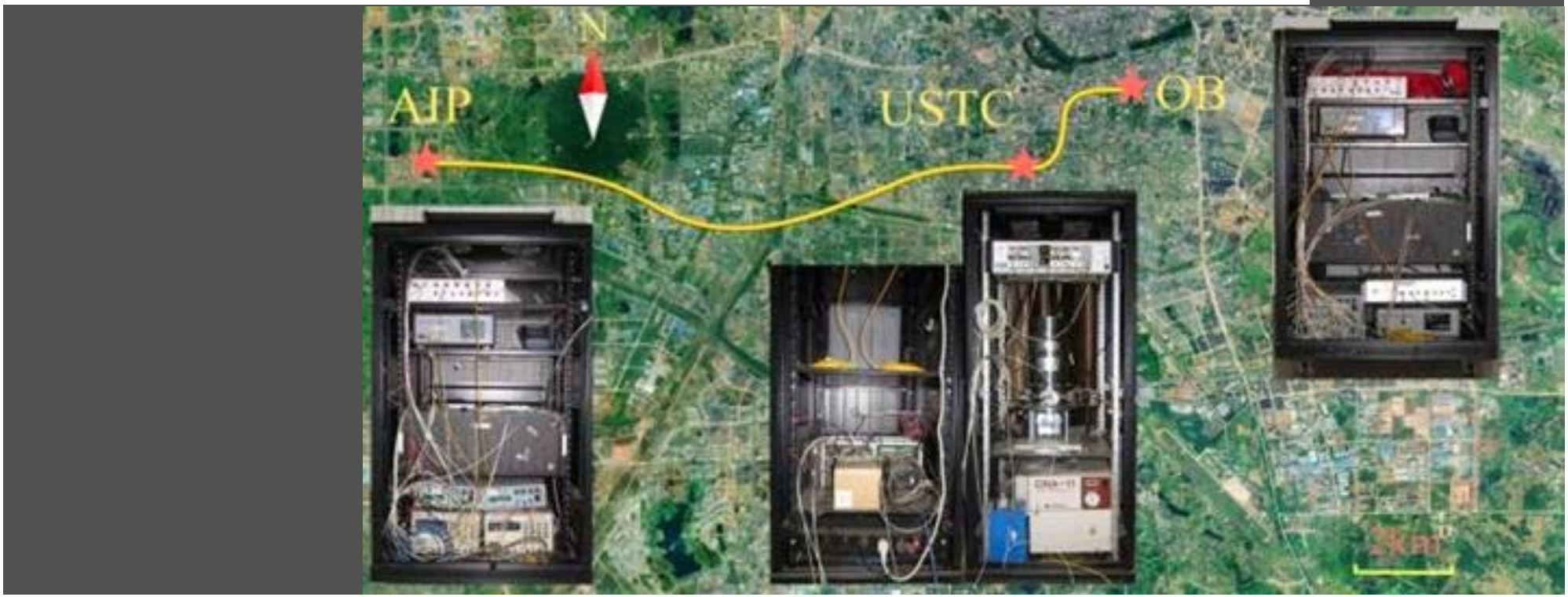
Computing / Quantum computing

The man turning China into a quantum superpower

Jian-Wei Pan, China's "father of quantum", is masterminding its drive for global leadership in technologies that could change entire industries.

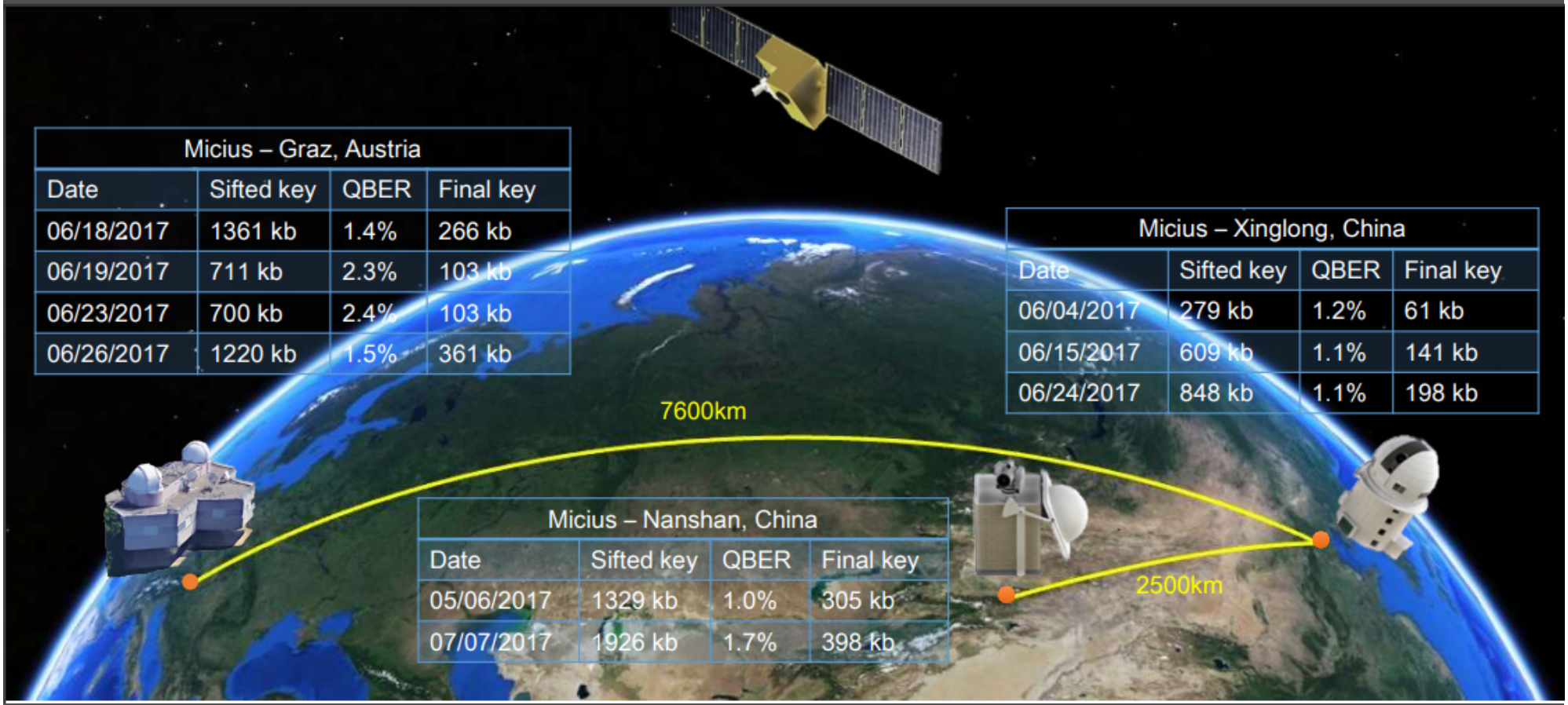
by **Martin Giles**

Dec 19, 2018



- Integration of

National QC Backbone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QUANTUM INFORMATION

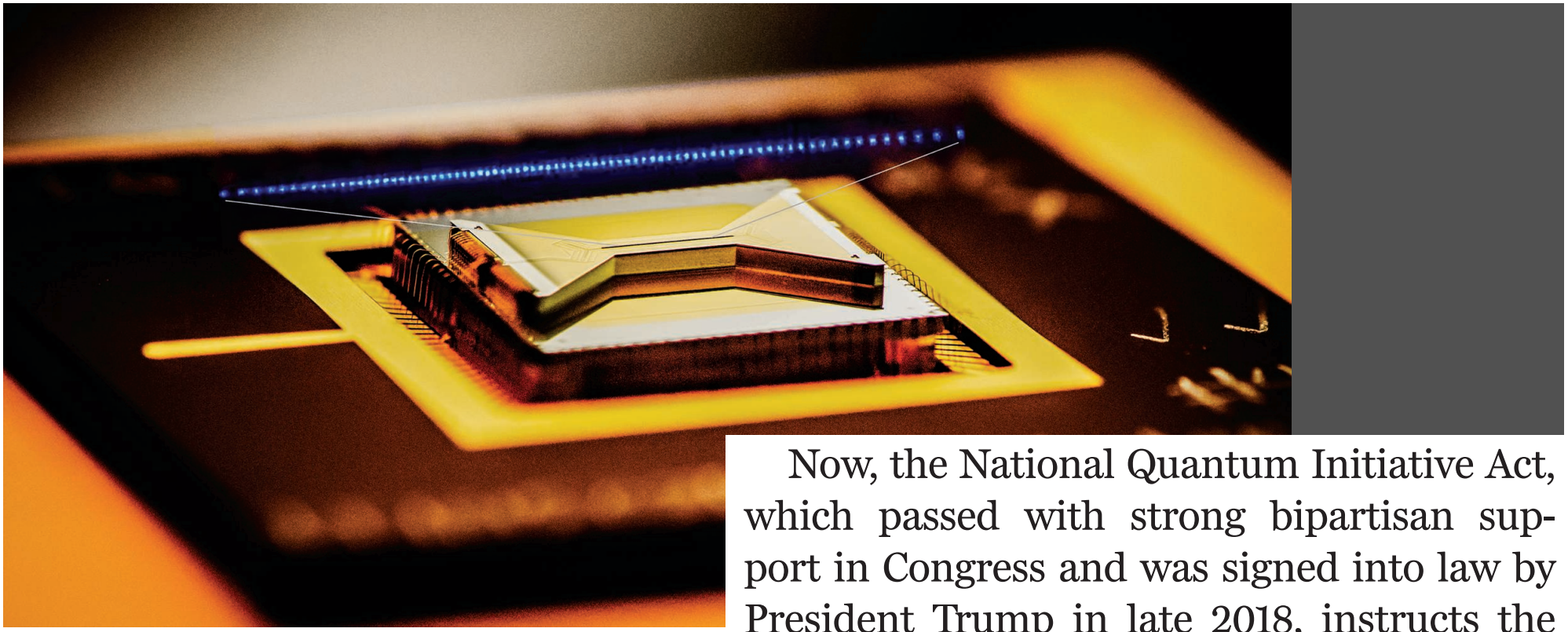
The U.S. National Quantum Initiative: From Act to action

Academia, agencies, and industry will work together

By **Christopher Monroe[1,2], Michael G. Raymer[3], Jacob Taylor[4,5]**

Although quantum information science and technology (QIST) is based on fundamental physical tenets familiar to many in the academic world, it remains alien to much of the industrial and engineering workforce that will the National Science Foundation (NSF) has a three-decade record of supporting a diverse complement of QIST researchers. More recently, the U.S. Department of Energy (DOE) Office of Science and laboratories have helped expand team-based efforts, and agencies such as NASA continue smaller-scale research and development.

Now, the National Quantum Initiative Act,



A semiconductor chip ion trap, fabricated by Sandia National Laboratories, is composed of gold-pl
surface of the chip. The chip (bow-tie shape) is about 10 mm across. The inset is a magnified imag

Now, the National Quantum Initiative Act, which passed with strong bipartisan support in Congress and was signed into law by President Trump in late 2018, instructs the NIST, NSF, and DOE to work with academic institutions and private industry to catalyze the growth of QIST, largely through formation of the NQI. The NQI looks to follow a science-first approach that will stimulate development and use of new technologies spanning academia, government laboratories, and industry. This approach will enable collaboration across borders, as other countries embark upon similar paths.

No Brasil – Institutos do Milênio + Institutos Nacionais de Ciência e Tecnologia

Instituto do Milênio de Informação Quântica (CNPq) → 2001-2005/ 2005-2009

Instituto Nacional de Informação Quântica – INCT-IQ

(CNPq/FAPESP) →2009-2016

(CNPq/FAPERJ) →2016-atual

INCT-IQ

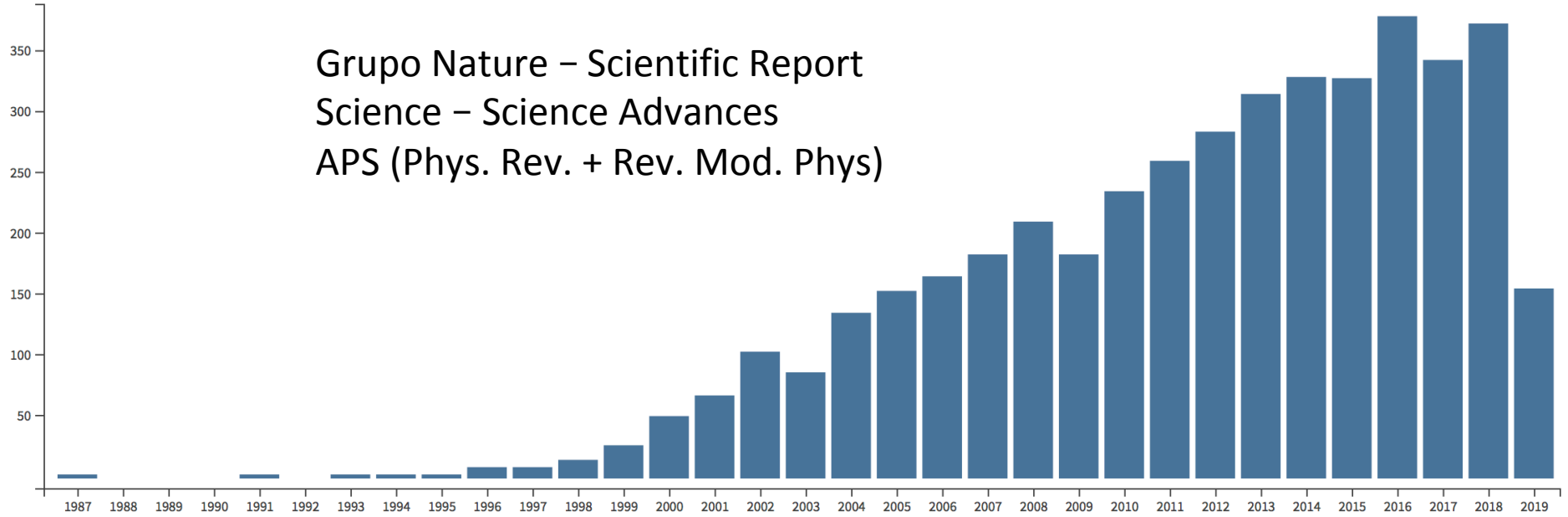
Instituto Nacional de Ciência e Tecnologia de Informação Quântica

Total de publicações

4.373 Analisar

Publicações – Quantum Information

Grupo Nature – Scientific Report
Science – Science Advances
APS (Phys. Rev. + Rev. Mod. Phys)



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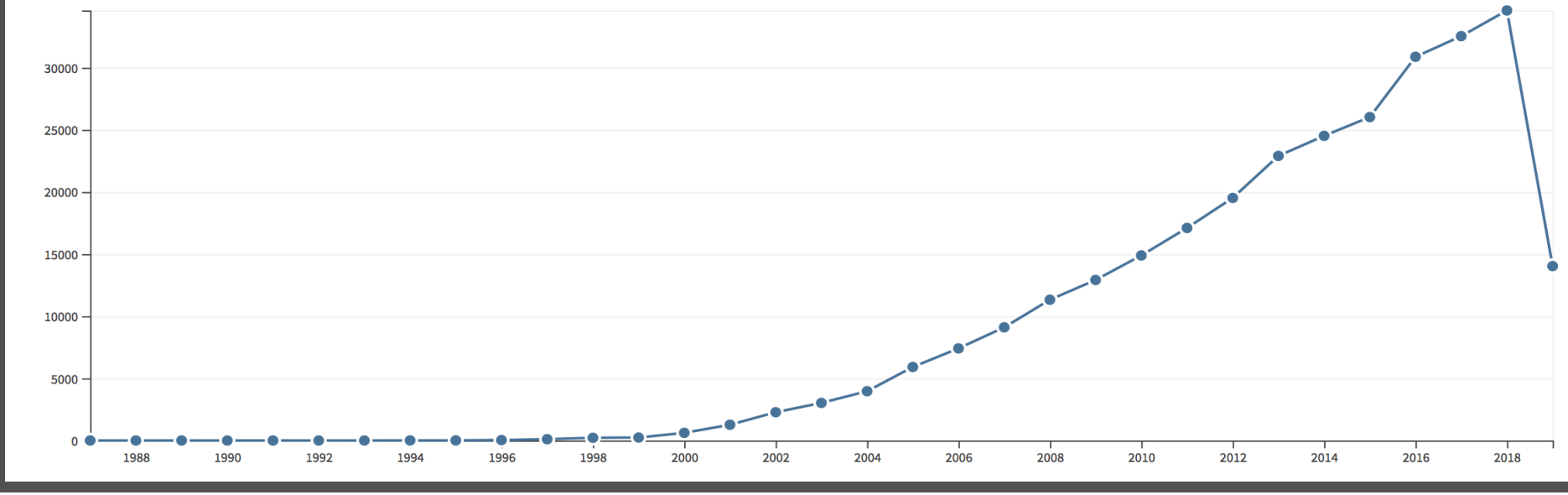
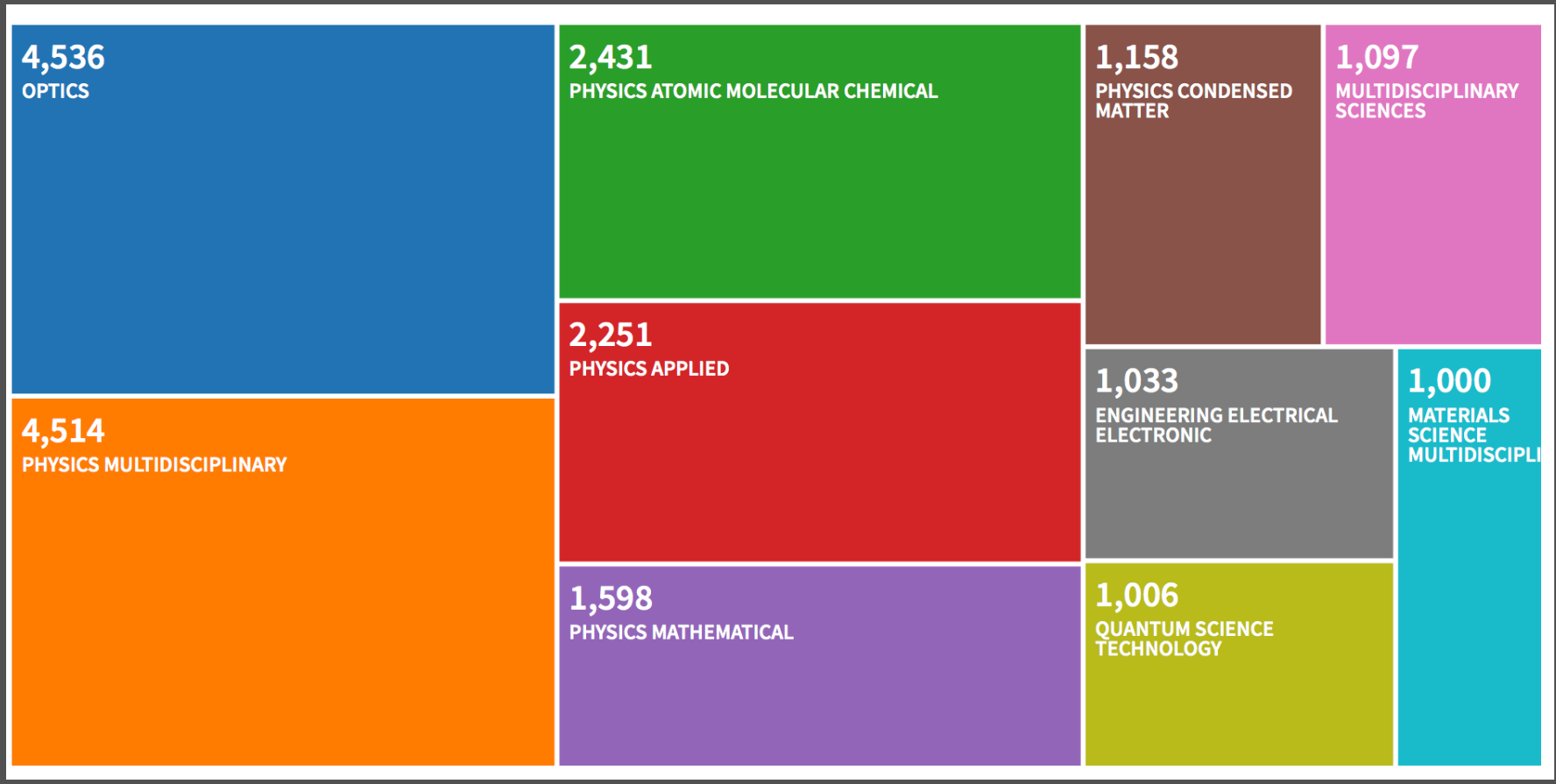
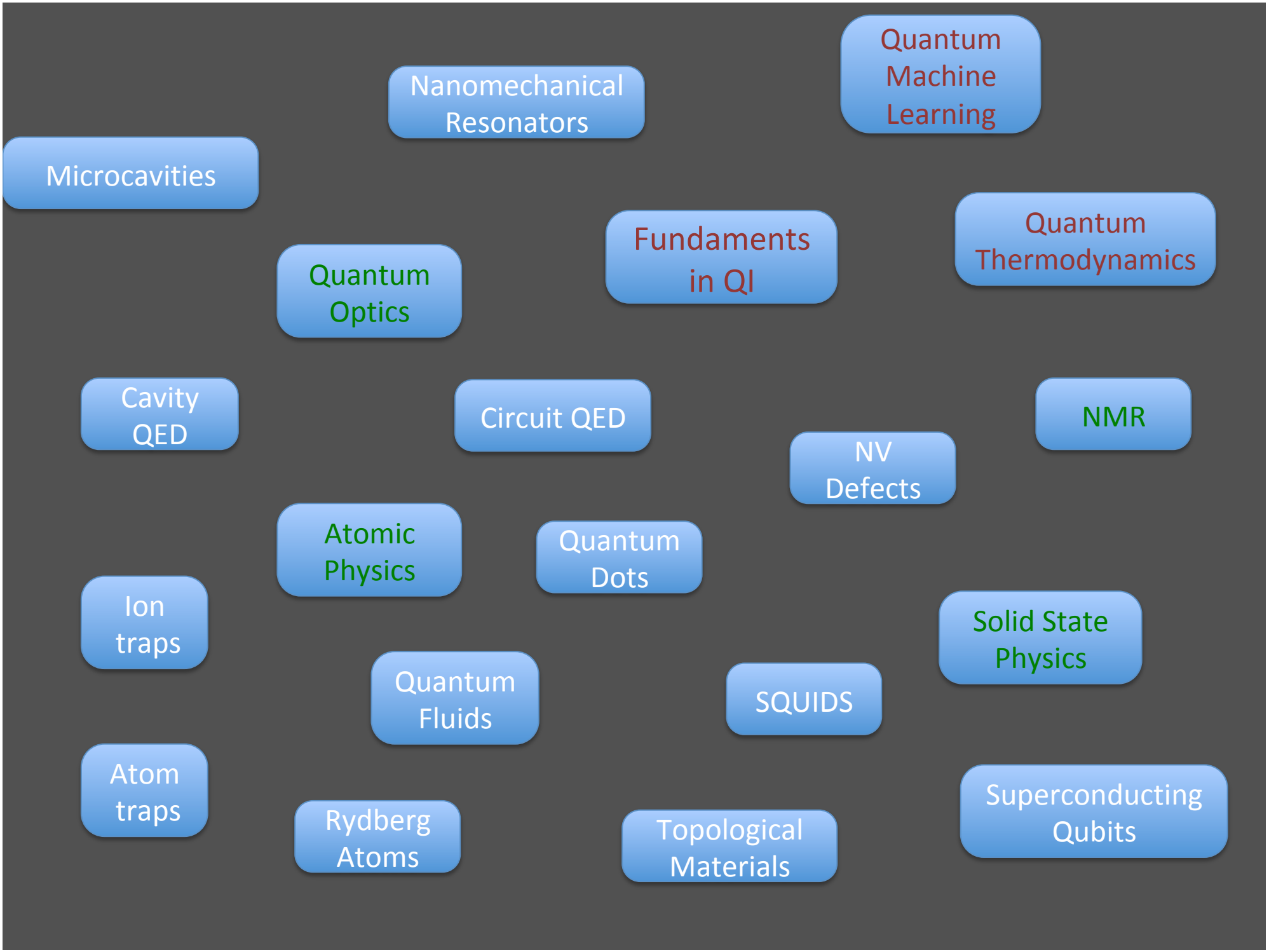


Publicações – Quantum Information




Quantum Machine Learning
Nanomechanical Resonators
Microcavities
Fundaments in QI
Quantum Thermodynamics
Quantum Optics
Cavity QED
Circuit QED
NMR
NV Defects
Atomic Physics
Quantum Dots
Ion traps
Solid State Physics
Quantum Fluids
SQUIDS
Atom traps
Superconducting Qubits
Rydberg Atoms
Topological Materials

Instituto de Física Gleb Wataghin

Gustavo Wiederhecker (optomecânica em microcavidades) - JPII

Tiago Alegre (nanoressonadores óticos e mecânicos) - JPII

Felippe Barbosa (ótica em microcavidades) – JP

Francisco Rouxinol (CQED – NEMS) – JP

Pierre Louis de Assis (quantum dots) – JP solicitado

Lázaro Padilha (ótica não-linear e ultra-rápida) – JP

Teoria

Amir Caldeira

José Antônio Roversi

Antônio Barranco

Marcos de Oliveira

Marcelo Terra Cunha - IMECC

Universidade Federal do ABC

Experimental

Breno Marques (qubits, ótica quântica)

Luciano Cruz (física atômica, ótica quântica)

Rafael Rothganger (íons aprisionados)

Teoria

Roberto Serra

Fernando Semião

André Landulfo

IFSC USP

Experimental

Philippe Courteille (atom trap)

Luiz Marcassa (Rydberg atoms)

Sérgio Muniz (NV defects)

Teoria

Frederico Borges

Reginaldo Napolitano

Miled Moussa

ufscar

Experimental

Romain Bachelard (atom trap)

Teoria

Salomon Mizrahi

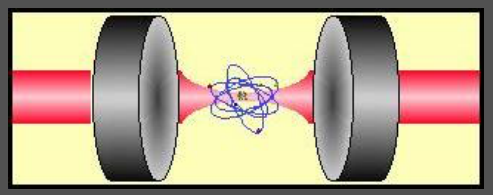
Celso Villas-Boas

IFUSP
Instituto de Física da USP

Ótica Quântica – LMCAL

Paulo Nussenzveig

Marcelo Martinelli



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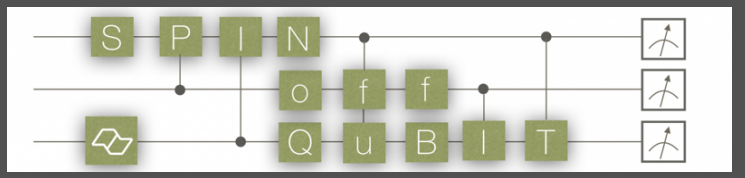
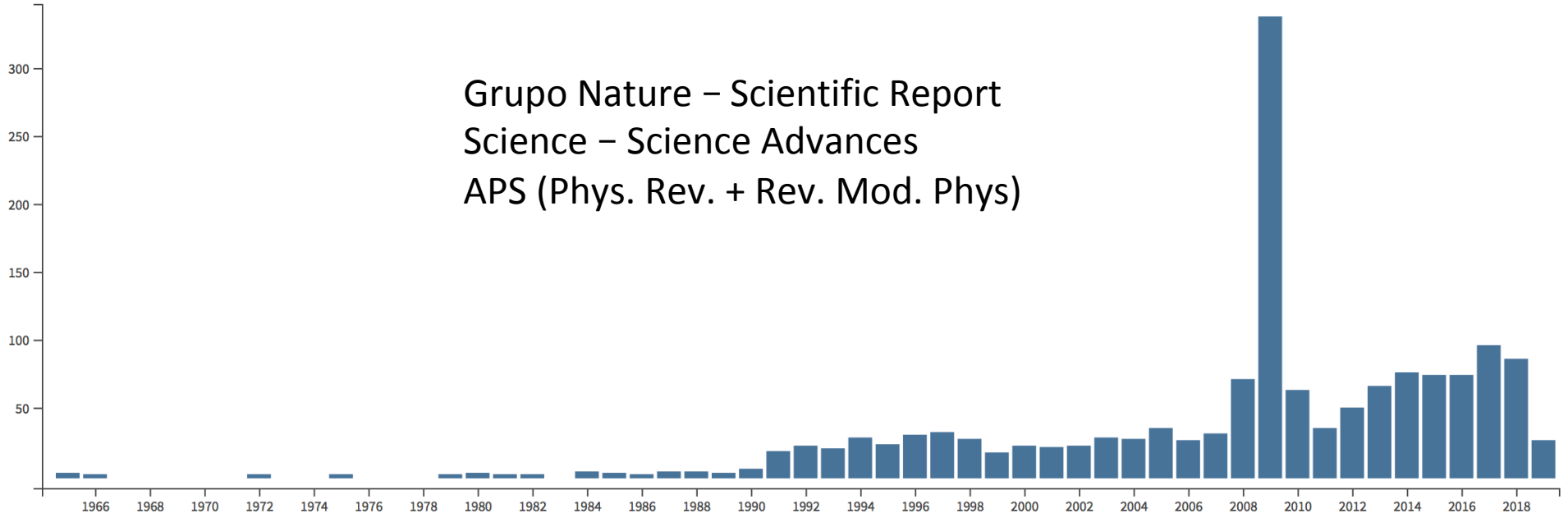


Total de publicações

1.513 Analisar

Publicações – Quantum Optics



Grupo Nature – Scientific Report
Science – Science Advances
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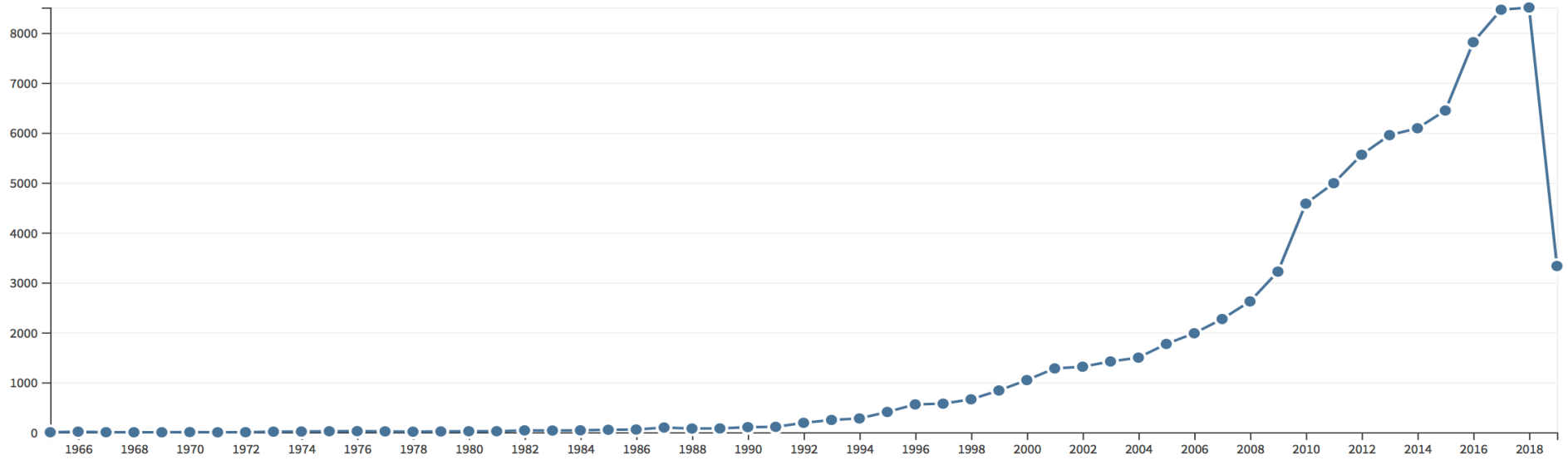
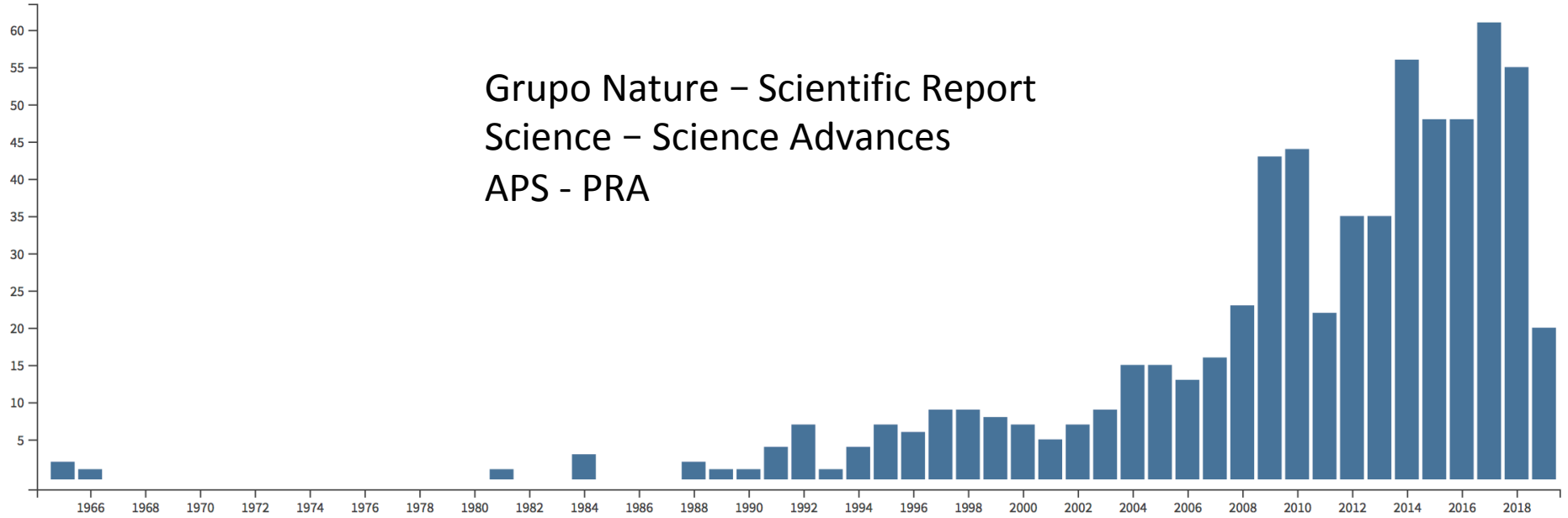


Total de publicações

643 Analisar

Publicações – Quantum Optics



Grupo Nature – Scientific Report
Science – Science Advances
APS - PRA

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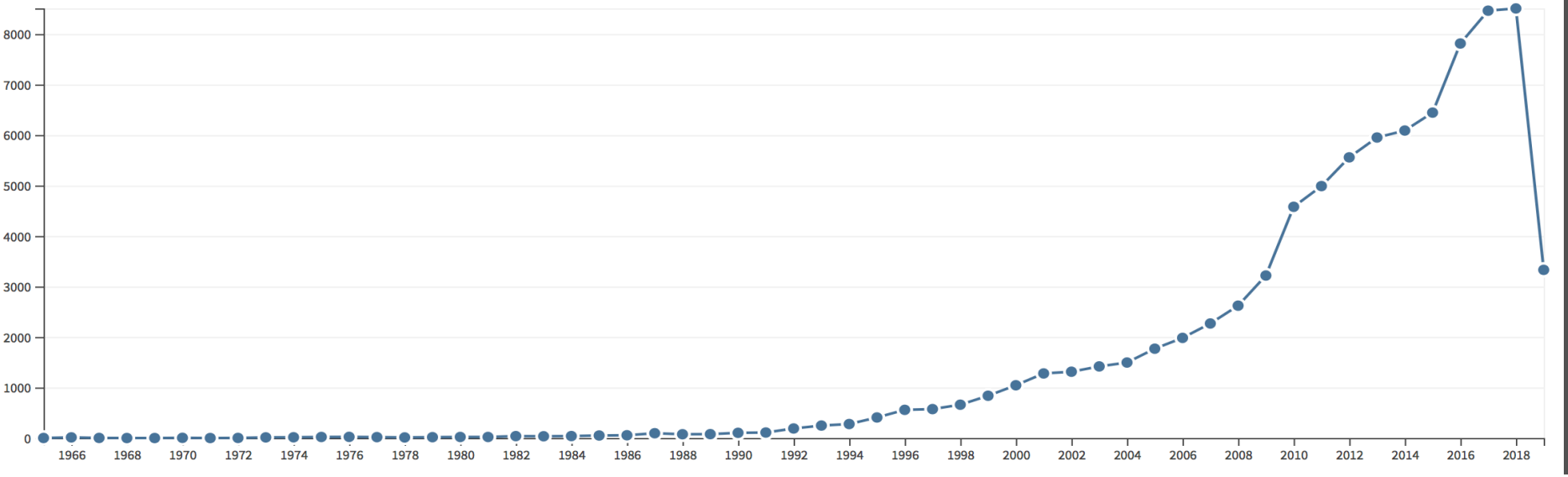

REPORTS

Three-Color Entanglement

A. S. Coelho,[1] F. A. S. Barbosa,[1] K. N. Cassemiro,[2] A. S. Villar,[2,3] M. Martinelli,[1] P. Nussenzveig[1]*

www.sciencemag.org SCIENCE VOL 326 6 NOVEMBER 2009 823

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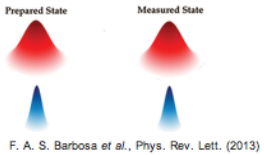
Synopsis: Photon Reader Loses Less in Translation



F. A. S. Barbosa *et al.*, Phys. Rev. Lett. (2013)

Quantum state reconstruction of spectral field modes: Homodyne and resonator detection schemes

F. A. S. Barbosa, A. S. Coelho, K. N. Cassemiro, P. Nussenzveig, C. Fabre, A. S. Villar, and M. Martinelli
Phys. Rev. A **88**, 052113 (2013)
Published November 14, 2013

Beyond Spectral Homodyne Detection: Complete Quantum Measurement of Spectral Modes of Light

F. A. S. Barbosa, A. S. Coelho, K. N. Cassemiro, P. Nussenzveig, C. Fabre, M. Martinelli, and A. S. Villar
Phys. Rev. Lett. **111**, 200402 (2013)
Published November 14, 2013

nature photonics
LETTERS
PUBLISHED ONLINE: 17 OCTOBER 2010 | DOI: 10.1038/NPHOTON.2010.222

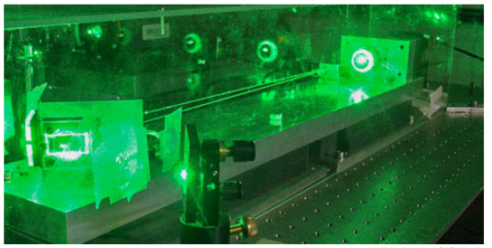
Robustness of bipartite Gaussian entangled beams propagating in lossy channels

F. A. S. Barbosa[1], A. S. Coelho[1], A. J. de Faria[1], K. N. Cassemiro[2], A. S. Villar[2,3], P. Nussenzveig[1] and M. Martinelli[1]*

Synopsis: A Sextet of Entangled Laser Modes

August 13, 2018

Researchers have entangled six modes of a laser cavity—a record number for such a device.



M. Martinelli/University of São Paulo

Print

Exploring six modes of an optical parametric oscillator

Luis F. Muñoz-Martínez, Felippe Alexandre Silva Barbosa, Antônio Sales Coelho, Luis Ortiz-Gutiérrez, Marcelo Martinelli, Paulo Nussenzveig, and Alessandro S. Villar
Phys. Rev. A 98, 023823 (2018)
Published August 13, 2018

Hexapartite Entanglement in an above-Threshold Optical Parametric Oscillator

F.A.S. Barbosa, A.S. Coelho, L.F. Muñoz-Martínez, L. Ortiz-Gutiérrez, A.S. Villar, P. Nussenzveig, and M. Martinelli
Phys. Rev. Lett. 121, 073601 (2018)
Published August 13, 2018

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