



## PhD fellowships

2012 – 2016 **FPI Fellowship**, *Ministero de Economía y Competitividad, Spain*.  
PhD fellowship

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## Publications

### Published papers

- [1] Angela Capel, Angelo Lucia, and David Pérez-García. “Quantum conditional relative entropy and quasi-factorization of the relative entropy”. In: *Journal of Physics A: Mathematical and Theoretical* (2018). DOI: 10.1088/1751-8121/aae4cf. arXiv: 1804.09525 [quant-ph]. In press.
- [2] Michael J. Kastoryano and Angelo Lucia. “Divide and conquer method for proving gaps of frustration free Hamiltonians”. In: *Journal of Statistical Mechanics: Theory and Experiment* (Mar. 2018). DOI: 10.1088/1742-5468. arXiv: 1705.09491 [math-ph].
- [3] Johannes Bausch, Toby S. Cubitt, Angelo Lucia, David Pérez-García, and Michael M. Wolf. “Size-Driven Quantum Phase Transitions”. In: *Proceedings of the National Academy of Sciences* (Dec. 2017). DOI: 10.1073/pnas.1705042114. arXiv: 1512.05687 [quant-ph].
- [4] Ángela Capel, Angelo Lucia, and David Pérez-García. “Superadditivity of quantum relative entropy for general states”. In: *IEEE Transactions on Information Theory* (Nov. 2017). DOI: 10.1109/TIT.2017.2772800. arXiv: 1705.03521 [quant-ph].
- [5] Fernando G.S.L. Brandao, Toby S. Cubitt, Angelo Lucia, Spyridon Michalakis, and David Perez-Garcia. “Area law for fixed points of rapidly mixing dissipative quantum systems”. In: *J. Math. Phys.* 56 (Sept. 2015), p. 102202. DOI: 10.1063/1.4932612. arXiv: 1505.02776 [quant-ph].
- [6] Toby S. Cubitt, Angelo Lucia, Spyridon Michalakis, and David Perez-Garcia. “Stability of Local Quantum Dissipative Systems”. In: *Communications in Mathematical Physics* 337.3 (Apr. 2015), pp. 1275–1315. ISSN: 0010-3616. DOI: 10.1007/s00220-015-2355-3. arXiv: 1303.4744 [quant-ph].
- [7] Angelo Lucia, Toby S. Cubitt, Spyridon Michalakis, and David Pérez-García. “Rapid mixing and stability of quantum dissipative systems”. In: *Phys. Rev. A* 91 (4 Apr. 2015). Rapid Communication, p. 040302. DOI: 10.1103/PhysRevA.91.040302. arXiv: 1409.7809 [quant-ph].

### Papers in preparation

- [1] Houssam Abdul-Rahman, Marius Lemm, Angelo Lucia, Bruno Nachtergaele, and Amanda Young. *A class of two-dimensional AKLT models with a gap*. Jan. 2019. arXiv: 1901.09297 [math-ph]. Pre-published.
- [2] Bergfinnur Durhuus and Angelo Lucia. *Recursion relations for chromatic coefficients for graphs and hypergraphs*. Jan. 2019. arXiv: 1901.00899 [math.CO]. Pre-published.
- [3] Matthias Christandl, Angelo Lucia, Péter Vrana, and Albert H. Werner. *Tensor network representations from the geometry of entangled states*. Sept. 2018. arXiv: 1809.08185 [quant-ph]. Pre-published.

- [4] Johannes Bausch, Toby Cubitt, Angelo Lucia, and David Perez-Garcia. *Undecidability of the Spectral Gap in One Dimension*. Oct. 2018. arXiv: 1810.01858 [quant-ph]. Pre-published.
- [5] Michael J. Kastoryano, Angelo Lucia, and David Pérez-García. *Locality at the boundary implies gap in the bulk for 2D PEPS*. Sept. 2017. arXiv: 1709.07691 [quant-ph]. Pre-published.

## Long visits and programs

- 2017 **UC Santa Barbara**, *Kavli Intitute for Theoretical Physics*, Santa Barbara, USA.  
November 13th – December 16th, Quantum Physics of Information program
- 2017 **Intitut Henri Poincaré**, Paris, France.  
October, Analysis in Quantum Information Theory program
- 2016 **University of Copenhagen**, *Niels Bohr International Academy*, Copenhagen, Denmark.  
September – November
- 2014 **California Institute of Technology**, *IQIM*, Pasadena, USA.  
April – July
- 2013 **University of Cambridge**, *Newton Institute and DAMPT*, Cambridge, UK.  
September – December, Mathematical challenges in quantum information program

## Talks

### Invited talks

- 2019 **Plenary lecture**, *Congreso Bienal de la Real Sociedad Matemática Española*, Santander, February 4th–8th.
- 2018 **Undecidability of spectral gap in 1D**, *Mathematical Challenges in Many-Body Physics and Quantum Information*, Montreal, October 15th–19th.  
**Rapid mixing in dissipative many-body quantum systems**, *Conferencia Premio Rubio de Francia*, UAM, Madrid, October 5th.  
**Rapid mixing in dissipative many-body quantum systems**, *Workshop on quantum functional inequalities*, Toulouse, June 12th.

### Refereed conference talks

- 2018 **Locality at the boundary implies gap in the bulk for 2D PEPS**, *XIX International Congress on Mathematical Physics*, Montreal, July.  
**A limitation on the asymptotic decay of vanishing spectral gaps**, *Young Researchers Symposium ICMP 2018*, Montreal, July 20th.  
**Locality at the boundary implies gap in the bulk for 2D PEPS**, *Theory of Quantum Computation, Communication and Cryptography*, Sydney, July 16th.
- 2015 **Area law for fixed points of rapidly mixing dissipative quantum systems**, *Theory of Quantum Computation, Communication and Cryptography*, Brussels, May 2nd.
- 2014 **Stability of local quantum dissipative systems**, *17th Workshop on Quantum Information Processing (QIP2014)*, Barcelona, February 3th.
- 2013 **Stability of local quantum dissipative systems**, *Noise Information & Complexity @ Quantum Scale*, Erice (Sicily), October 10th.

**Stability of local quantum dissipative systems**, *Quantum Information Processing and Communications 2013*, Florence, July 2nd.

**Stability of local quantum dissipative systems**, *Intensive Month on Operator Algebra and Quantum Information*, ICMAT, Madrid, June 18th.

### Seminar talks

- 2017 Dec. **University of California, Davis**, *Department of Mathematics*, Davis, USA.  
Mar. **ICFO**, *Prof. Antonio Acín's group*, Castelldefels, Barcelona, Spain.
- 2016 May **Universidad Carlos III Madrid**, *Q-Math Seminar*, Madrid, Spain.
- 2015 Oct. **Max Planck Institute of Quantum Optics**, *Theory seminar*, Garching, Germany.  
**Technical University of Munich**, *Prof. Michael Wolf's group*, Garching, Germany.  
Sep. **Universitat Autònoma de Barcelona**, *Andreas Winter's group*, Barcelona, Spain.
- 2014 July **Google**, *Quantum A.I.*, Venice, Los Angeles, USA.  
Jun. **University of Southern California**, *Dept. of Physics & Astronomy*, Los Angeles, USA.  
May **Caltech**, *IQIM*, Pasadena, USA.  
**University of California, Davis**, *Department of Mathematics*, Davis, USA.
- 2013 May **University of Cambridge**, *DAMPT*, Cambridge, UK.

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## Teaching and professional services

### Organization

- 2017 **Master Class on Exotic Phases of Matter**, *University of Copenhagen*.  
Local organizing committee

### Teaching experience

- 2017/2018 **University of Copenhagen**, *Teaching assistant*.  
Quantum Information Theory (14h): graduate course, February-April 2018
- 2015/2016 **Universidad Complutense de Madrid**, *Teaching assistant*.  
Groups of ~30 students of 1st and 2nd year undergraduate Calculus:
- Análisis de variable real (50h)
  - Cálculo integral (15h)
  - Métodos matemáticos para la ingeniería (15h)

### Pedagogy courses

- 2017 **Introduction to University Pedagogy**, *Participant in course*.  
77 working hours/3 ECTS course at Copenhagen University

### Referee for journals and conferences

Communications in Mathematical Physics, Journal of Mathematical Physics, Quantum Information and Computation, Workshop on Quantum Information and Processing (QIP), International Journal of Quantum Information

## References

### Research

- David Pérez García (Universidad Complutense de Madrid) dperezga@ucm.es
- Toby S. Cubitt (University College London) t.cubitt@ucl.ac.uk
- Jan Philip Solovej (University of Copenhagen) solovej@math.ku.dk
- Matthias Christandl (University of Copenhagen) christandl@math.ku.dk

### Teaching

- Jesus Angel Jaramillo Aguado (Universidad Complutense de Madrid) jaram@mat.ucm.es