

Ricardo Puebla Antunes

PhD Student

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Education

- Since **PhD Student**, *Quantum Controlled Dynamics Group*, Institute of Theoretical Physics, Ulm University, Germany.
October 2013 Supervisor: Martin B. Plenio
- 2011 – 2012 **Master of Science in Nuclear Physics**, *Interuniversity*, Spain.
Master thesis: *Quantum Phase Transitions and symmetry-breaking in the Dicke Model* with the qualification of Honor's Registration
- 2010 – 2011 **Exchange student (Erasmus program)**, *Technische Universität München (TUM)*, Munich.
- 2006 – 2011 **Licenciatura in Physics**, *Universidad Complutense de Madrid (UCM)*.
Theoretical physics specialty.

Work Experience

- October 2011 – September 2013 **Student fellow of GFN (Nuclear Physics Group)**, *Atomic, molecular and nuclear physics department*, Universidad Complutense de Madrid.
Research and work areas: Computational physics, radiotherapy simulations, medical imaging and software developer.
- May 2011 – August 2011 **Student fellow of T30a (Theoretical Atomic Physics)**, *Technische Universität München*, TUM.
Research project: *Break-up Threshold in Helium Atoms. High correlated two-atoms states* with J. Madroñero and H. Friedrich
September 2011 - January 2012, research collaboration at distance.
- January 2010 – June 2010 **Teacher**, *Mathematics, Physics and Chemistry for high school and preparation for university entrance exam*, Academia Retiro, Madrid.

Languages

- Spanish **Mother tongue.**
Portuguese **Advanced level.**
English **Advanced level.**
German **Medium-high level.**

Publications

10. **Protected ultrastrong coupling regime of the two-photon quantum Rabi model with trapped ions**,
R. Puebla, M.-J. Hwang, J. Casanova and M. B. Plenio,
Submitted to Phys. Rev. A [arXiv:1703.10539](https://arxiv.org/abs/1703.10539).

9. **Fokker-Planck formalism approach to Kibble-Zurek scaling laws and nonequilibrium dynamics,**
R. Puebla, R. Nigmatullin, T. E. Mehlstäubler and M. B. Plenio,
Phys. Rev. B **95**, 134104 (2017) [arXiv:1702.02099](#).
[doi:10.1103/PhysRevB.95.134104](https://doi.org/10.1103/PhysRevB.95.134104)
8. **Probing the Dynamics of a Superradiant Quantum Phase Transition with a Single Trapped Ion,**
R. Puebla, M.-J. Hwang, J. Casanova and M. B. Plenio,
Phys. Rev. Lett. **118**, 073001 (2017) [arXiv:1607.03781](#).
[doi:10.1103/PhysRevLett.118.073001](https://doi.org/10.1103/PhysRevLett.118.073001)
7. **A robust scheme for the implementation of the quantum Rabi model in trapped ions,**
R. Puebla, J. Casanova and M. B. Plenio,
New J. Phys. **18**, 113039 (2016) [arXiv:1608.07434](#).
[doi:10.1088/1367-2630/18/11/113039](https://doi.org/10.1088/1367-2630/18/11/113039)
6. **Excited-state quantum phase transition in the Rabi model,**
R. Puebla, M.-J. Hwang and M. B. Plenio,
Phys. Rev. A **94**, 023835 (2016) [arXiv:1607.00283](#).
[doi:10.1103/PhysRevA.94.023835](https://doi.org/10.1103/PhysRevA.94.023835)
5. **Quantum Phase Transition and Universal Dynamics in the Rabi model,**
M.-J. Hwang, R. Puebla and M. B. Plenio,
Phys. Rev. Lett. **115**, 180404 (2015) *Editor's Suggestion* [arXiv:1503.03090](#).
[doi:10.1103/PhysRevLett.115.180404](https://doi.org/10.1103/PhysRevLett.115.180404)
4. **Irreversible processes without energy dissipation in an isolated Lipkin-Meshkov-Glick model,**
R. Puebla and A. Relaño,
Phys. Rev. E **92**, 012101 (2015) [arXiv:1404.6146](#).
[doi:10.1103/PhysRevE.92.012101](https://doi.org/10.1103/PhysRevE.92.012101)
3. **Phase space determination of electron beam for intraoperative radiation therapy from measured dose data,**
E. Herranz, J. L. Herraiz, P. Ibáñez, M. Pérez-Liva, R. Puebla, J. Cal-González, P. Guerra, R. Rodríguez, C. Illana and J. M. Udías,
Phys. Med. Biol. **60**, 375 (2015).
[doi:10.1088/0031-9155/60/1/375](https://doi.org/10.1088/0031-9155/60/1/375)
2. **Non-thermal excited-state quantum phase transitions,**
R. Puebla and A. Relaño,
EPL **104**, 50007 (2013). [arXiv:1305.3077](#).
[doi:10.1209/0295-5075/104/50007](https://doi.org/10.1209/0295-5075/104/50007)
1. **Excited-state phase transition leading to symmetry-breaking steady states in the Dicke model,** *R. Puebla, A. Relaño, and J. Retamosa,*
Phys. Rev. A **87**, 023819 (2013). [arXiv:1209.5320](#).
[doi:10.1103/PhysRevA.87.023819](https://doi.org/10.1103/PhysRevA.87.023819)

Proceedings

1. **Quantum phase transitions and spontaneous symmetry-breaking in Dicke model**,
R. Puebla, A. Relaño, and J. Retamosa,
AIP Conf. Proc. **1541**, 191 (2013).
[doi:10.1063/1.4810842](https://doi.org/10.1063/1.4810842)

Scientific Activities

- 29 August - **European Conference on Trapped Ions**, Arosa
- 2 September 2016 **Poster**: Probing the Dynamics of Superradiant Quantum Phase Transition in a Single Trapped-Ion.
- 6-9 June 2016 **8th Workshop on Quantum Phase Transitions in Nuclei and Many-Body Systems**, Prague
- Talk**: QPT and ESQPT in the Rabi model.
Talk: Irreversibility due to the loss of symmetry-breaking information crossing an ESQPT. .
- 11-15 April 2016 **1st RICE School *New Trends in Quantum Information* and ICE-3 Conference, IFISC (UIB-CSIC) (Mallorca)**
- Talk**: In- and out-of-equilibrium physics of the superradiant quantum phase transition in the Rabi model.
- 28-4 March 2016 **DPG Spring Meeting**, University of Hannover
- Talk**: Quantum phase transition and universal dynamics in the Rabi model.
- 21-25 September 2015 **Excite-State Quantum Phase Transitions**, ECT* (Trento)
- Talk**: On the dynamical consequences of ESQPTs in isolated quantum systems: irreversible closed cycles.
- 14-15 September 2015 **Correlations Cooperative effects, correlations and many-body physics tailored by strongly confined optical fields**, ICFO (Barcelona)
- Talk**: Quantum phase transition and universal dynamics in the Rabi model.
- 15-19 July 2015 **XXXV Biennial Meeting of Spanish Royal Society of Physics (RSEF)**, Universidad de Oviedo
- Talk**: Quantum phase transition and nonequilibrium universal dynamics in the Rabi model at *Quantum Information Symposium*.
- 25-29 May 2015 **Workshop on New Trends in Complex Quantum Systems Dynamics**, Universidad Politécnica de Cartagena
- Poster**: Universal out-of-equilibrium dynamics close to the quantum phase transition in the Rabi model.
- 10-13 March 2014 **7th Workshop on Shape-Phase Transitions and Critical Point Phenomena in Nuclei**, Universidad de Sevilla
- Talk**: Non-thermal nature of phase transitions in Dicke and Lipkin-Meshkov-Glick models.
- 15-19 July 2013 **XXXIV Biennial Meeting of Spanish Royal Society of Physics (RSEF)**, Universidad de Valencia
- Talk**: Non-thermal excited-state quantum phase transitions in two-level systems at *Complex Systems Symposium*..

14-16 **VII Spanish Meeting of Nuclear Physics (EFN12)**, *La Rábida, Huelva*
September **Poster**: Phase transitions and symmetry-breaking in the Dicke Model.
2012

09-13 **International Meeting in Nuclear Physics (Basic concepts in Nuclear**
September **Physics: theory, experiments and applications)**, *La Rábida, Huelva*
2012 **Poster**: Quantum phase transitions in the Dicke Model.