

Dr. Daniel Huerga

Research Interests

- Strongly-correlated quantum systems | Frustrated quantum magnetism
- Quantum simulation and computation
- Machine learning & Quantum machine learning

Experience

- March 2018 – **Postdoctoral Researcher**, *OpenSuperQ (EU Quantum Flagship)*
Department of Physical Chemistry, UPV/EHU, Bilbao (Spain)
- 2014 – 2017 **Postdoctoral Researcher**,
Institut für Theoretische Physik III, Universität Stuttgart (Germany)
- 2010 – 2014 **Doctoral Researcher**,
Spanish National Research Council (CSIC), Madrid (Spain)

Teaching

- Summer 2017 Solid State Theory (Problems), MSc. Physics, Universität Stuttgart
- Winter 2016/2017 Quantum Mechanics I (Problems), BSc. Physics, Universität Stuttgart
- Summer 2016 Quantum Field Theory (Problems), MSc. Physics, Universität Stuttgart
- Winter 2015/2016 Quantum Mechanics II (Problems), MSc. Physics, Universität Stuttgart
- Summer 2015 Solid State Theory (Problems), MSc. Physics, Universität Stuttgart

Education

- 2014 **PhD Physics**, *Universidad Autónoma de Madrid (Spain)*
- 2009 **MSc Theoretical Physics**, *Université Pierre et Marie Curie, Paris (France)*
- 2007 **BSc Physics (5 years)**, *Universidad Autónoma de Madrid (Spain)*

Competitive Grants

- 2016 Jülich Supercomputer Center (Germany) | Computing time (250.000 core-hours)
- 2014 Spanish Ministry of Economy | Stay at Leibniz Universität Hannover (Germany)
- 2013 Spanish Ministry of Economy | Stay at CNRS, Toulouse (France)
- 2012 Spanish Ministry of Science and Innovation | Stay at LPT-CNRS, Toulouse (France)
- 2011 Spanish Ministry of Science and Innovation | Stay at Indiana University, Bloomington IN (USA)
- 2008 Foundation Bank La Caixa | MSc. studies at École Normale Supérieure, Paris (France)
- 2008 Foundation Bank Caja Madrid | MSc. studies at UC Davis, (USA) —Declined

Communications

- 2019 Talk, 1st OpenSuperQ Meeting, Göteborg (Sweden)
- 2017 Seminar, Theoretical Nanophysics Dept., LMU Munich (Germany)
Talk, March Meeting of the American Physical Society, New Orleans (USA)
- 2016 Talk, Int. Workshop ‘Correlations, criticality and integrability...’, Evora (Portugal)

- Seminar, Instituto de Física de Rosario, CONICET (Argentina)
- 2015 Talk, Meeting of the German Physical Society (DPG), Berlin (Germany)
 Poster, International Conference ‘Advanced Numerical Algorithms...’, Würzburg (Germany)
- 2014 Seminar, Institut für Theoretische Physik III, Stuttgart Universität (Germany)
 Poster, Int. Workshop ‘Quantum gases and quantum coherence’, Levico, Trento (Italy)
 Seminar, Institut für Theoretische Physik, Leibniz Universität Hannover (Germany)
- 2013 Seminar, Laboratoire Physique Théorique, CNRS, Toulouse (France)
 Talk, 5th Meeting of the Madrid Cold Atoms Network, Madrid (Spain)
 Talk, Workshop ‘Quantum Phase Transitions in Molecular...’, Huelva (Spain)
 Seminar, Instituto de Estructura de la Materia, CSIC, Madrid (Spain)

Publications

1. *Translation-invariant parent Hamiltonians of valence bond crystals*,
D. Huerga, A. Greco, C. Gazza, and A. Muramatsu, Phys. Rev. Lett. 118, 167202 (2017)
2. *Staircase of crystal phases of hard-core bosons on the Kagome lattice*,
D. Huerga, S. Capponi, J. Dukelsky, and G. Ortiz, Phys. Rev. B 94, 165124 (2016)
3. *Density-dependent synthetic magnetism for ultra-cold atoms in optical lattices*,
 S. Greschner, **D. Huerga**, G. Sun, D. Poletti, L. Santos, Phys. Rev. B 92, 115120 (2015)
4. *Composite fermion-boson mapping for fermionic lattice models*,
 J. Zhao, C. A. Jimenez-Hoyos, G. E. Scuseria, **D. Huerga**, J. Dukelsky, S. M. A. Rombouts and G. Ortiz, J. Phys.: Condens. Matt. 26, 455601 (2014)
5. *Chiral phases of two-dimensional hard-core bosons with frustrated ring-exchange*,
D. Huerga, J. Dukelsky, N. Laflorencie, G. Ortiz, Phys. Rev. B 89, 094401 (2014)
6. *Composite boson mapping for lattice boson systems*,
D. Huerga, J. Dukelsky, G. E. Scuseria, Phys. Rev. Lett. 111, 045701 (2013)

Stays in Research Institutes

- 2017 Department of Physics, Washington University, St. Louis (USA)
- 2016 Instituto de Física de Rosario, CONICET (Argentina)
 Laboratoire de Physique Théorique, CNRS Toulouse (France)
- 2015 Instituto de Estructura de la Materia, CSIC, Madrid (Spain)
- 2014 Institut für Theoretische Physik, Leibniz Universität Hannover (Germany)
- 2013 Laboratoire de Physique Théorique, CNRS Toulouse (France)
- 2012 Laboratoire de Physique Théorique, CNRS Toulouse (France)
 Dept. of Chemistry, Rice University, Houston (USA)
- 2011 Dept. of Physics, Indiana University, Bloomington (USA)
- 2009 Institute for Mineralogy and Condensed Matter Physics (IMPMC), Paris 6 (France)

Personal Interests

- Music** Degree in Music, Professional Conservatory of Music Adolfo Salazar, Madrid (2000-2006)
- Sports** Alpinism | Running | Swimming | Basketball (Madrid Regional League, 1992-2001)