

**Workshop on “Correlations, criticality, and coherence in quantum systems”
Évora, Portugal, 6-10 October 2014**

Scientific Program

Sunday, 5 October

15:00 - 15:15 Opening of the I2CAM Sponsored Tutorial Day

15:15 - 16:30 Lecturer: Anders Sandvik
Title: *Quantum criticality and numerical simulations*

16:30 – 16:45 Discussions

16:45 - 17:15 Break

17:15 - 18:30 Lecturer: Miguel Costa
Title: *An introduction to the AdS/CFT duality*

18:30 – 18:45 Discussions

Monday, 6 October

09:00 Welcome

09:10 – 9:40 Invited: Henrik Johannesson
Title: *Synthetic helical liquid in a quantum wire*

9:40 – 10:10 Invited: Karl Landsteiner
Title: *Anomalies and transport: from the quark gluon plasma to Weyl semi-metals on a superstring*

10:10 – 10:30 Contributed: Alexander A. Zyuzin
Title: *Chiral electromagnetic waves in Weyl semimetals*

10:30 – 11:00 Coffee break

11:00 – 12:00 Invited colloquium: Miguel Costa
Title: *Thermodynamics of the BMN matrix model at strong coupling*

12:00 – 12:20 Contributed: Emilia da Silva
Title: *Holographic relaxation of finite size isolated quantum systems*

12:20 – 12:40 Contributed: Erik S. Sørensen
Title: *Dynamics at a quantum critical point: combining quantum Monte Carlo and holography*

12:40 Lunch break

15:00 – 15:30 Invited: Stephan Rachel
Title: *From correlated topological insulators to spin liquids and iridates*

15:30 – 16:00 Invited: Maria Daghofer
Title: *Topologically nontrivial phases in correlated multi-orbital systems*

16:00 – 16:20 Contributed: S. Kourtis
Title: *Strongly correlated topological states of spinless fermions in two-dimensional lattices*

16:20 – 16:50 Coffee break

16:50 – 17:20 Invited: Gerardo Adesso
Title: *Quantum correlations as local coherence: applications to metrology*

17:20 – 17:40 Contributed: F. Illuminati
Title: *Understanding quantum phases of matter: entanglement, frustration, and local convertibility*

17:40 – 18:00 Contributed: Daniel Arovas
Title: *Topological order and absence of band insulators at integer filling in non-symmorphic crystals*

18:00 – 18:15 In memoriam by Hong-Gang Luo
Shi-Jian Gu

Tuesday, 7 October

09:00 – 9:30 Invited: Pedro Schlottmann

Title: *Crossover from non-Fermi liquid to Fermi liquid behavior and the superconductivity dome in heavy electron systems*

09:30 – 10:00 Invited: Assa Auerbach

Title: *Transport theory of strongly interacting bosons and short coherence length superconductors*

10:00 – 10:20 Contributed: L. Ortenzi

Title: *Structural origin of the anomalous temperature dependence of the local magnetic moments in the CaFe_2As_2 family of materials*

10:20 – 10:50 Coffee break

10:50 – 11:20 Invited: Ribhu Kaul

Title: *Spin-liquid behavior of a simple spin model on the triangular lattice*

11:20 – 11:50 Invited: Stephen Powell

Title: *Scaling dimensions of higher-charge monopoles at deconfined critical points*

11:50 – 12:10 Contributed: B. Valenzuela

Title: *Microscopic nematicity in iron superconductors*

12:10 – 12:30 Contributed: Shenglong Xu

Title: *Sign problem free Monte Carlo simulation of itinerant ferromagnetism*

12:30 Lunch break

15:00 – 15:30 Invited: Susanne Viefers

Title: *Rotational properties of two-component Bose gases in the lowest Landau level*

15:30 – 16:00 Invited: Hong-Gang Luo

Title: *Kondo and Fano resonance in correlated impurity systems*

16:00 – 16:20 Contributed: D. Hoffmann

Title: *Measurement of T^* in the BEC-BCS crossover regime*

16:20 – 16:50 Coffee break

16:50 – 17:20 Poster presentations (2 minutes each)

17:20 Poster session I

Wednesday, 8 October

09:00 – 9:30 Invited: Leonid Levitov

Title: *Chern bands and topological currents in graphene superlattices*

09:30 – 10:00 Invited: Andrea Young

Title: *Tuning and probing symmetry breaking in graphene quantum Hall ferromagnets*

10:00 – 10:20 Contributed: J. L. Lado

Title: *Non-collinear magnetic phases and edge states in graphene quantum Hall bars*

10:20 – 10:50 Coffee break

10:50 – 11:50 Invited colloquium: Francisco (Paco) Guinea

Title: *Graphene as an anharmonic membrane*

11:50 – 12:20 Invited: Ivan Brihuega

Title: *Point defects as a source of local magnetic moments on graphene layers*

12:20 – 12:40 Contributed: B. Amorim

Title: *Thermodynamics of Quantum Crystalline Membranes*

12:40 – 13:00 Contributed: A. Cortijo

Title: *Large conduction band and Fermi velocity spin splittings due to Coulomb interactions in single-layer MoS₂*

13:00 Lunch break

14:50 Social program

Includes guided visits to specific Évora's historical sites and to interesting exhibitions in the Forum Eugénio de Almeida (<http://www.fundacaoeugeniodealmeida.pt>).

20:00 Banquet

Thursday, 9 October

09:00 – 9:30 Invited: Netanel Lindner

Title: *Engineering new non-Abelian systems: fractionalized Majorana fermions and beyond*

09:30 - 09:50 Contributed: R. Queiroz

Title: *Helical Majorana state in strongly disordered superconductors*

09:50 – 10:20 Invited: Erez Berg

Title: *Coherent transmutation of electrons into fractionalized anyons*

10:20 – 10:50 Coffee break

10:50 – 11:20 Invited: Marcos Rigol

Title: *Quantum quenches in the thermodynamic limit*

11:20 – 11:50 Invited: Fabien Alet

Title: *Participation spectroscopy and entanglement Hamiltonian of quantum spin*

11:50 – 12:10 Contributed: G. van Miert

Title: *Spin-orbit coupling in graphynes*

12:10 – 12:30 Contributed: John R. Tolsma

Title: *Orbital order and effective mass enhancement in t_2g two-dimensional electron gases*

12:30 Lunch break

15:00 – 15:30 Invited: Ricardo Mendes Ribeiro

Title: *Full relativistic calculations on 2D materials*

15:30 – 16:00 Invited: Didier Poilblanc

Title: *Studying correlated systems with PEPS*

16:00 – 16:20 Contributed: Giandomenico Palumbo

Title: *Induced topological order at the boundary of 3D topological superconductors*

16:20 – 16:50 Coffee break

16:50 – 17:20 Poster presentations (2 minutes each)

17:20 Poster session II

Friday, 10 October

09:00 – 10:00 Invited colloquium: Dionys Baeriswyl

Title: *Thermodynamic limit and order parameter of the reduced BCS Hamiltonian*

10:00 – 10:20 Contributed: S. V. Mironov

Title: *In-plane FFLO states in superconductor-ferromagnet structures*

10:20 – 10:40 Contributed: E. C. Marino

Title: *Quantum valley Hall effect and other emergent phenomena induced by the electromagnetic interaction in graphene*

10:40 – 11:10 Coffee break

11:10 – 11:40 Invited: Zhong-Bing Huang

Title: *Theoretical and experimental study of aromatic hydrocarbon superconductors*

11:40 – 12:00 Contributed: R. Roldán

Title: *Effects of strain in MoS₂: bandgap engineering and valley polarized current*

12:00 – 12:20 Contributed: Luca Chirulli

Title: *Zero-bias conductance peak in detached flakes of superconducting 2H-TaS probed by scanning tunneling spectroscopy*

12:20 Summary and closing remarks

Complementary program

The workshop participants are invited to attend the following University of Évora seminar also held in Anfiteatro 131-A

14:30 – 15:00 Seminar: B. Hetényi

Title: *A comprehensive theory of transport: distinguishing insulators, conductors, superconductors, and bosonic superfluids*