

Speaker: Ali Zahra, University of Lorraine, Nancy
Title: Symmetry-resolved entanglement in the large deviation regime: breakdown of equipartition
Date: Wednesday, April 29, 10 am (s.t.)
Place: Seminar room 915

Abstract: Symmetry-resolved entanglement in the large deviation regime: breakdown of Equipartition

We study particle-number fluctuations and symmetry-resolved entanglement in the ground state of the one-dimensional Tonks–Girardeau gas for a large interval. We show that the probability of observing a given particle-number fraction satisfies a large-deviation principle, in agreement with earlier results from random-matrix and Coulomb-gas methods. In this regime, the symmetry-resolved entanglement entropy changes qualitatively: instead of exhibiting equipartition and logarithmic growth as in the typical-fluctuation regime, it obeys an area law and approaches a finite value determined by the filling fraction. Using a hydrodynamic saddle-point approach, we derive exact expressions for the large-deviation function, the symmetry-resolved entanglement, and the associated conditioned density profiles, and we recover equipartition in the typical limit. This work is in collaboration with Jérôme Dubail and Attila Takács.