# Breakdown of superfluidity and extreme value statistics in a one dimensional Bose gas

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Phase coherence is a key ingredient of many characteristic quantum effects in transport phenomena, some of the most striking ones being superfluidity, conductance quantization, or the quantum Hall effect. In particular, interference effects have a prominent role in presence of disorder, resulting in weak or strong Anderson localization.

In this talk I will discuss statistical properties of a one dimensionnal Bose-Einstein condensate at rest or moving through a disordered region of finite extent. I will focus on the superfluid fraction and the critical velocity and demonstrate their connections to extreme value statistics of the random environment.
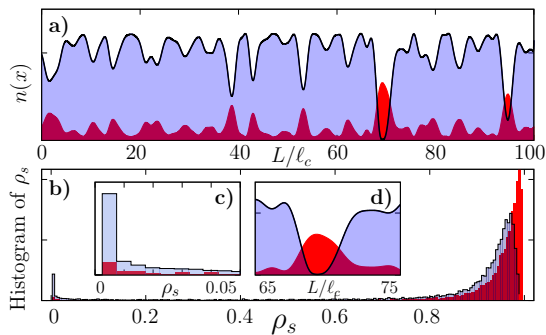
**Language:** English.



Figure 1: **a)** Spatial density of a disordered one dimensional Bose-Einstein condensate (blue) and the corresponding speckle potential (red). **b)** Histogram of the superfluid fraction for two different system size.