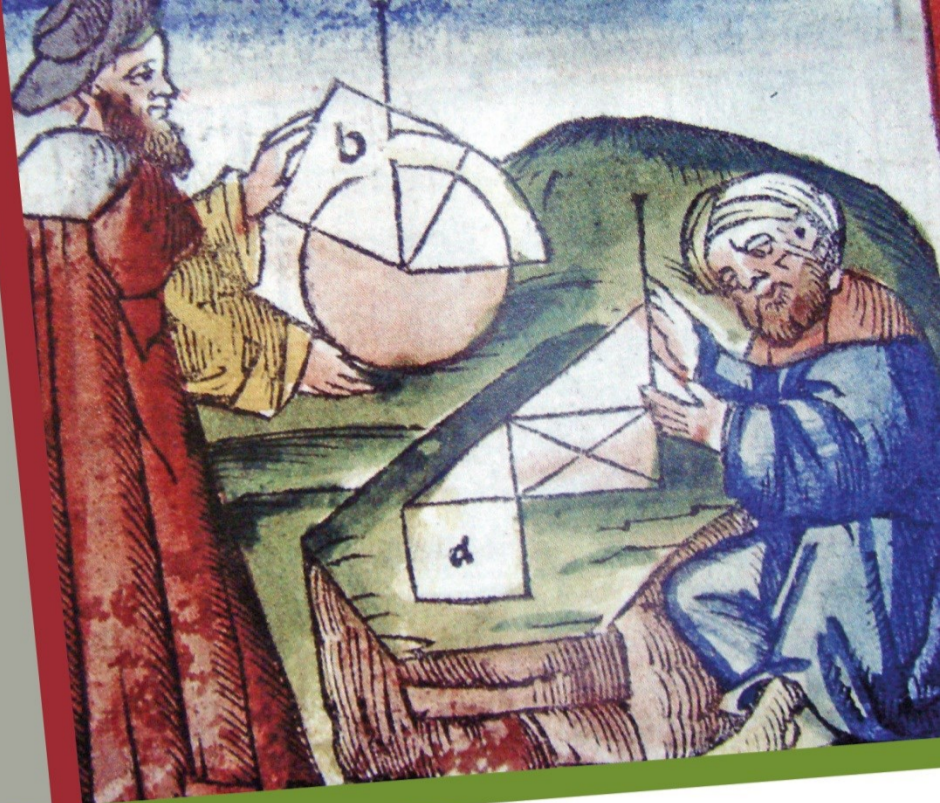




UNIVERSITÀ DEGLI STUDI  
DI TRENTO

Dipartimento di Matematica



# SEMINARI

**Thursday, September 7<sup>th</sup>, 2023 – at 2:30 p.m.**

**Seminar Room “1” – Povo0, Via Sommarive 14**

**and online through the ZOOM platform**

**<https://unitn.zoom.us/j/82578903026> (Passcode: 978062)**

**Francesca Cottini**

**(University of Luxembourg and National University of Singapore)**

## **Gaussian fluctuations for 2d directed polymers**

### **Abstract**

The model of directed polymer in random environment describes a perturbation of the simple random walk caused by a random environment (disorder). In recent years, there has been extensive research on the partition functions of this model and its asymptotic behavior on large scale, also motivated by their link with the solution of the Stochastic Heat Equation.

After introducing the model and its motivations, we will focus on the 2d case. We will provide an overview of the main results regarding the fluctuations of the partition functions in both the sub-critical regime (where a deep understanding has by now been obtained) and the critical regime (where many key questions are still open). We will also highlight the distinctions between these observed phenomena.

We will then present an alternative and convenient technique to recover both existing and new results. This method is based on a novel CLT for polynomial chaos (i.e. a multi-linear polynomial of independent random variables) which only requires second moment computations. If time allows, we will also discuss the so-called quasi-critical regime, which bridges the gap between the sub-critical and the critical regime and identifies the most extended range where Gaussian fluctuations hold, before reaching the critical regime where they fail.

The talk is based on joint works with Francesco Caravenna and Maurizia Rossi (University of Milano-Bicocca).

**Contact persons:** Stefano Bonaccorsi, Michele Coghi

### **CONTATTI**

**Staff di Dipartimento – Matematica**

**tel. 0461 281508-1625-1701-3786-1511**

**[dept.math@unitn.it](mailto:dept.math@unitn.it)**

**[www.maths.unitn.it](http://www.maths.unitn.it)**