Probability Seminar

Title: Shattering Phase and Metastability for Spin Glasses

Speaker: Gerard Ben Arous (NYU)

Date: Wed 14th April 2021 at 4:00PM

Location: Online

Abstract: I will report mainly on a a recent joint work with Aukosh Jagannath (Waterloo). Spin glasses are complex models of statistical mechanics, which have been studied and understood in real depth by physicists since the 70's, both in their statics and dynamics properties. I will briefly survey the current mathematical understanding in the case of spherical models of spin glasses, using the approach based on the topological complexity of the energy landscapes. This approach has been shown to be a powerful tool for the low temperature phase of "replica-symmetry breaking', but I will here address questions pertaining to a higher temperature regime in the "replica-symmetric phase'. In this regime, we find that there are at least two distinct temperatures related to non-trivial behavior. First we prove that there is a regime of temperatures in which the spherical p-spin model exhibits a shattering phase. We then find that metastable states exist up to an even higher temperature as predicted by Barrat-Burioni-Mezard. This work is based on a Thouless-Anderson-Palmer decomposition which builds on the work of Eliran Subag. We then present a series of questions and conjectures regarding the sharp phase boundaries for shattering and slow mixing.

Zoom Link: https://ucd-ie.zoom.us/j/83491228915?pwd=WWV3ZkNGNzVXdGxLRlR0dkdMYUtMZz0

Meeting ID: 834 9122 8915 Passcode: 698437