SPEAKER:

Frédéric Klopp, Sorbonne Université and UC Berkeley

TITLE:

On the spatial extent of localized eigenfunctions for random Schrd̈inger operators

ABSTRACT:
On $\mathbb{Z}^d$, consider φ, an ℓ^2-normalized function that decays exponentially at ∞ at a rate at least μ. One can define the *onset length* (of the exponential decay) of φ as the radius of the smallest ball, say, B, such that one has the following global bound $|\varphi(x)| \leq \|\varphi\|_\infty e^{-\mu \operatorname{dist}(x,B)}$. The present talk will describe the onset lengths of the localized eigenfunctions of random Schrödinger operators. Under suitable assumptions, we prove that, with probability one, the number of eigenfunctions in the localization regime having onset length larger than ℓ and localization center in a ball of radius L is smaller than $CL^d \exp(-c\ell)$, for $\ell > 0$ large (for some constants $C, c > 0$). Thus, most eigenfunctions localize on small size balls independent of the system size which is the physicists understanding of localization; to our knowledge, this did not result from existing mathematical estimates. The talk is based on joint work with Jeff Schenker.