

***Eigenvalue Fluctuations for Lattice Anderson Hamiltonian***

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***Abstract***

In this talk, we discuss a homogenization problem for the Schrödinger operator with a random potential. This type of operator is called the Anderson Hamiltonian and the nature of its spectrum is well studied on the whole space. However, in the homogenization context, it is much less understood. We established the homogenization of the eigenvalue of the Anderson operator under the "optimal" moment condition on the potential and, also identified the fluctuation around the mean value. Our results partially extend a previous work by Guillaume Bal (2008), based on the perturbation expansion, which covers the dimensions less than or equal to three.

In fact, this type of problem has been studied more in a similar but singular setting called "the crushed ice problem", that is, the Laplacian in a randomly perforated domain. Kac and Rauch-Taylor established the homogenization of eigenvalues in a certain limiting regime. Later Figari-Orlandi-Teta and Ozawa found a Gaussian fluctuation of the eigenvalues around the limits in the three-dimensional case. The proof of homogenization is based on the analysis of the Wiener sausage whereas the fluctuation result is proved by a rather heavy perturbation method as in Bal's work.

Our argument gives a probabilistic approach to the fluctuation result based on a martingale central limit theorem and we hope that it is useful to extend the fluctuation result in the crushed ice setting to general dimensions.

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