Seminar/Talk

Approximate spectral approach to asymptotic transport properties of quantum waves

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Host: Julian Fischer

We discuss the long-time transport properties of the Schrödinger equation with a disordered potential of weak intensity. In the periodic setting, the usual Bloch wave decomposition reduces the problem to the perturbation of a simple isolated eigenvalue, while in the quasi-periodic case the corresponding eigenvalue is no longer isolated and while in the random case it is even immersed in an absolutely continuous spectrum. Such a perturbation analysis in the periodic setting easily leads to asymptotic ballistic transport properties, but the situation is very different and much more unclear in the two other situations. And for good reasons: in the random setting it is indeed known that the transport rather becomes diffusive on very long timescales. In this talk, we show how the construction of a truncated perturbation series, only approximately solving the perturbed eigenvalue equation, can be used in the quasi-periodic setting to rigorously prove that ballistic transport holds at least up to exponential times. In the random setting, a similar approach allows to optimally determine the critical time up to which ballistic transport holds, in terms of the decay of the correlations of the potential.

Thursday, April 6, 2017 04:00pm - 06:00pm
Seminar room Big Ground floor / Office Bldg West (I21.EG.101)

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