Spectral properties of quasiperiodic Schroedinger operators: treating small denominators without KAM

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ABSTRACT
Two classical small divisor problems arise in the study of spectral properties of quasiperiodic Schroedinger operators, one related to Floquet reducibility (for low couplings of the potential term), and the other related to localization (for high couplings). Both have been traditionally attacked by sophisticated KAM-type methods.

In this talk I will discuss more recent non-KAM based methods for both localization and reducibility, that are significantly simpler and lead, where applicable, to stronger results. In particular they usually lead to so-called nonperturbative (i.e. uniform in the Diophantine frequency) estimates on the coupling, and sometimes to the results covering the entire expected region of couplings.

I will discuss the recent joint work with A. Avila on nonperturbative reducibility, with various sharp spectral consequences in the low coupling regime, and review earlier results by J. Bourgain, M. Goldstein, W. Schlag, and the speaker, on nonperturbative localization.