

## Analysis and Applied Mathematics Seminar

### *Semiclassical approximations to quantum mechanical expectation values*

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**Abstract:** In his 1932 paper, Eugene Wigner introduced the now famous Wigner function in order to compute quantum corrections to classical equilibrium distributions. We show how to extend this program and compute semiclassical approximations to time evolved quantum observables as well as quantum mechanical equilibrium distributions for slow, semiclassical degrees of freedom coupled to fast, quantum mechanical degrees of freedom. The main examples are molecules and electrons in crystalline solids. The semiclassical formulas contain, in addition to quantum corrections similar to those of Wigner, also modifications of the classical Hamiltonian system used in the approximation: The classical energy and the Liouville measure on classical phase space turn out to have non-trivial-expansions in the semiclassical parameter. This talk is based on joint work with Stefan Teufel.

Monday, September 14 at 4:00 PM in SEO 636