Titel: Long time semiclassical dynamics and delocalisation of eigenstates

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Abstract:
In this talk we will consider the semiclassical dynamics of a quantum particle on a compact manifold for large time-scales, tending to infinity as the semiclassical parameter tends to zero. We are able describe the form of the effective equations satisfied by the corresponding Wigner functions for a class of geometric settings, and show the existence of a critical time scale for which their behaviour switches from classical transport to an effective equation whose nature depends on global dynamical properties of the underlying classical dynamics. We will consider in particular the examples of the sphere, the torus and the euclidean disk (for which the classical dynamics is completely integrable) and show that the effective equations are different for all those examples. We will also present applications to delocalisation properties of eigenfunctions for perturbed Schrödinger operators, as well as unique continuation results. This talk is based in joint works with N. Anantharaman, C. Fermanian-Kammerer, M. Léautaud and G. Rivière.