Quantum trajectories and the appearance of particle tracks in detectors

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Abstract. I will introduce the setting of quantum trajectories and review the key general results. Then I will focus on a particular model describing the phenomenon that a quantum particle propagating in a detector, such as a Wilson cloud chamber, leaves a track close to a classical trajectory. For this model I will present a mathematically rigorous analysis of the appearance of particle tracks, assuming that the Hamiltonian of the particle is quadratic in the position-and momentum operators, as for a freely moving particle or a harmonic oscillator.

The talk is based on a joint work with M. Ballesteros, T. Benoist and J. Frohlich.