Time-dependent wave packet simulations of transport through Aharanov-Bohm interferometers

R.A. Molina,1 C. Kreisbeck, and T. Kramer

1Instituto de Estructura de la Materia - CSIC,
C/ Serrano, 123, 28006 Madrid, SPAIN

We have performed time-dependent wave packet simulations of realistic Aharonov-Bohm (AB) devices with a quantum dot embedded in one of the arms of the interferometer. The AB ring can function as a measurement device for the intrinsic transmission phase through the quantum dot, however, much care has to be taken in analyzing the influence of scattering processes in the junctions of the interferometer arms. We consider a harmonic quantum dot and show how the Darwin-Fock spectrum emerges as a unique pattern in the interference fringes of the AB oscillations.