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The wavefunction topography in the regime of Fano interference[1]
A. M. SATANIN, Institute for Physics of Microstructures, Nizhny Novgorod, Russia, Y. S. JOE, R. M. COSBY, Ball State University, Muncie, IN — In a point contact the wavefunctions belong to the continuum and the imaging of quantum states is based on measurements of the local density of states or the conductance. An attractive quantum dot in the 2D-waveguide can produce a Fano resonance in the conductance. We present here analytical calculations of conductance variation with the short range attractive potential for modeling the probe experiments in the regime of the Fano interference. It was shown that the wavefunction variation in the waveguide may be expressed through the Green's function of an unperturbed system if the characteristic size of the probing potential is less than the Fermi wavelength. We have found that in general the variation of the conductance depends on the phase interference of different waveguide modes. At the same time in the Fano regime in the conductance variation, there are dominant terms proportional to a resonant wavefunction. It was shown that this property suggests the possibility of extracting the wavefunction related to the Fano resonance.

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