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Quantum dot in a Aharonov-Bohm interferometer: magnetic flux-dependent pseudogap in the Kondo regime. PASCAL SIMON, CNRS and Universite Joseph Fourier, Grenoble, France, LUIS DIAS DA SILVA, Oak Ridge Natl. Lab. and U. of Tennessee, NANCY SANDLER, Ohio Univerisity, SERGIO ULLOA, Ohio University — We study a quantum dot embedded in one of the arms of a Aharonov-Bohm interferometer threaded by a magnetic flux Φ. In the regime where a single resonant mode propagates in the interferometer's "free arm", the system can be described by an effective one-channel Anderson impurity model coupled to a non-constant, flux-dependent density of states (DoS). We present numerical renormalization-group results for the Kondo temperature T_K, phase shift and finite-temperature linear conductance. For $\Phi \neq 0$, the ground state of the system is Kondo-like, with a renormalized T_K. For $\Phi = 0$, the effective DoS *vanishes* at the Fermi energy and the system maps into the pseudogap Anderson model, which displays a quantum critical transition between Kondo and non-Kondo phases [1]. Signatures of these effects appear in the conductance and transmission phase-shifts across the system. This setup constitutes an experimental realization of a tunable pseudogap Anderson Hamiltonian, allowing for an experimental probe into the non-trivial properties of such a model.
[1] L.G.G.V. Dias da Silva et al, PRL **97** 096603 (2006).
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