Quantum Impurities and Persistent Currents: Decoupling through Integrability[1] HANS-PETER ECKLE, Advanced Materials Science, University of Ulm, JOHAN NILSSON, Department of Physics, Boston University, HENRIK JOHANNESSON, Department of Physics, Goteborg University — We consider the problem of a persistent current in a one-dimensional mesoscopic ring with the electrons coupled by a spin exchange to a magnetic impurity. We show that this problem can be mapped onto an integrable model with a quadratic dispersion (with the latter property allowing for an unambiguous definition of the persistent current). We have solved the model exactly by a Bethe ansatz and found that the current is insensitive to the presence of the impurity. From the structure of the Bethe ansatz equations we conjecture that this result holds for any integrable quantum impurity model with an electronic dispersion $\epsilon(k)$ that is an even function of k.

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