

Abstract Submitted
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Quantum-criticality in models of an impurity coupled to fermionic and bosonic baths¹ KEVIN INGERSENT, U. of Florida, MATTHEW GLOSSOP, Rice U. — Impurity models exhibiting quantum phase transitions (QPTs) have attracted interest in connection with impurities in cuprate superconductors, heavy-fermion quantum criticality, and quantum-dot devices. This talk focuses on three models describing an impurity level coupled both to a band of fermions (either spinful or spinless) with a density of states varying as $|\epsilon|^r$ around the Fermi energy $\epsilon = 0$, and to a dissipative bosonic bath having a spectral function $\propto \omega^s$. Each of these models features a QPT between a phase in which the fermionic band dominates the impurity dynamics and a second phase in which the bosons freeze out the impurity degrees of freedom. We study these QPTs using a recently developed numerical renormalization-group technique. Over much of the parameter space spanned by the exponents r and s , the QPT in all three models falls into the universality class of the pure-bosonic spin-boson model, with exponents that are independent of r . However, for sufficiently strong fermionic pseudogaps (large values of r), new universality classes of QPT emerge.

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Kevin Ingersent
U. of Florida

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