Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Temperature Dependent Hybridization Gaps[1] PETER RISEBOROUGH, Physics Department Temple University — A number of heavy-fermion/mixed-valent materials show hybridization gaps either at the Fermi-energy or close to the Fermi-energy. In the former case, a heavy-fermion semiconducting state ensues and in the later case, the system remains metallic at low temperatures. In either case, the electronic structure is extremely temperature-dependent. It has been observed that the gap closes and the heavy quasiparticle bands disappear at high temperatures. The magnitude of the gaps scale with effective quasiparticle masses. A phenomenological model is presented that exhibits a temperature-dependence which is consistent with the above behavior. The model is based on a periodic array of Anderson impurities in which the electron correlations are represented by the coupling to bosons with an Einstein spectra. The model can be solved via systematic approximation. The solution describes the temperature- dependence of coherent and incoherent structures in the electronic excitation spectra. The predicted hybridization gaps for the metallic case are compared with data from photoemission experiments on UPd_2Al_3.

[1]This work was supported by the US DOE Office of Basic Energy Science through DE-FG02-01ER45872.

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Date submitted: 08 Nov 2010 Electronic form version 1.4