Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Theory for ESR in the heavy fermion system $\beta-\mathbf{YbAlB_4}$[1] ALINE RAMIRES, PIERS COLEMAN, Rutgers University — We propose a theory to explain the unusual temperature dependence of the Electron Spin Resonance (ESR) lines of the critical heavy fermion superconductor β-$YbAlB_4$. This system shows a conduction electron ESR signal at high temperatures, but at low temperatures its g-factor shifts to the f-electron g-factor and it develops strong anisotropy. With our theory we are able to explain this dichotomy based on the fact that the lower crystal field configuration of the local moments in this system is a pure $|\pm 5/2\rangle$. Because of its Ising nature these spins can not be directly probed by ESR, and the f-electron features that appear at low temperatures can be explained by an emergent hybridization model. We can account for the origin of this signal and its main characteristics qualitatively, including g-factor shift and the hyperfine structure with the assumption that the scattering rate is unusually small.

[1]Research supported by NSF Grant DMR 0907179

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Date submitted: 09 Nov 2012 Electronic form version 1.4