Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Quantitative Calculation of the Spatial Extension of the Kondo Cloud BERGMANN GERD, University of Southern California — A recently developed compact solution for the singlet state of the Friedel-Anderson and the Kondo impurity is applied to investigate the old question of a Kondo cloud in the Kondo ground state. Wilson's states with an exponentially decreasing frame of energy cells towards the Fermi level are used. The Wilson states are expressed as free electron waves with a linear dispersion and integrated over the width of their energy cells. For the magnetic state of the Friedel-Anderson impurity one finds essentially no spin polarization in the vicinity of the d-impurity. However, for the magnetic *component* of the singlet state a spin polarization cloud is observed which screens the spin (magnetic moment) of the d-electron. The range ξ_K of this polarization cloud is investigated in detail for the Kondo impurity. The range is inversely proportional to the Kondo energy Δ_K. The extent of the electron density in real space is a detector for a resonance in energy. The spatial extension ξ and the resonance width Δ are reciprocal and given by the relation $\xi\Delta \approx \hbar v_F$.

Bergmann Gerd
University of Southern California

Date submitted: 08 Nov 2007 Electronic form version 1.4