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Kondo decoherence: finding the right spin model for iron impurities in gold and silver J. VON DELFT, Ludwig-Maximilians-University Munich, T.A. COSTI, L. BERGQVIST, Forschungszentrum Julich, A. WEICHSELBAUM, Ludwig Maximilians University Munich, T. MICKLITZ, A. ROSCH, University of Cologne, P. MAVROPOULOS, P. DEDERICHS, Forschungszentrum Julich, F. MALLET, L. SAMINADAYAR, C. BÄUERLE, Institut Neel - CNRS and Universite Joseph Fourier — We exploit the decoherence of electrons due to magnetic impurities, studied via weak localization, to resolve a longstanding question concerning the classic Kondo systems of Fe impurities in the noble metals gold and silver: which Kondo-type model yields a realistic description of the relevant multiple bands, spin and orbital degrees of freedom? Previous studies suggest a fully screened spin S Kondo model, but the value of S remained ambiguous. We perform density functional theory calculations that suggest $S = 3/2$. We also compare previous and new measurements of both the resistivity and decoherence rate in quasi 1-dimensional wires to numerical renormalization group predictions for $S = 1/2, 1$ and $3/2$, finding excellent agreement for $S = 3/2$.

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