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Frequency Regimes of Kondo Dynamics in a Single-Electron Transistor[1] BRYAN HEMINGWAY, ANDREI KOGAN, University of Cincinnati, STEPHEN HERBERT, Xavier University, MICHAEL MELLOCH, Purdue University — It has been theoretically predicted that the Kondo temperature, T_K, serves as the intrinsic timescale for the formation of Kondo correlations between conduction electrons and local spin moments. To probe this timescale, we have measured the time averaged differential conductance, $\langle G\rangle = d\langle I\rangle/dV_{ds}$, of a single electron transistor in the spin 1/2 Kondo regime in presence of an oscillating bias voltage, $V(t)=V_{ds}+V_{AC}\sin(2\pi ft)$. We present the amplitude dependent conductance over select frequencies spanning several orders of magnitude below T_K to twice T_K ($T_K \sim 16$GHz). At frequencies above T_K, we find good agreement with theory [Kaminski, et al. Phys. Rev. B 62, 8154 (2000)] in both the low ($V_{AC} \sim T_K/10$) and high ($V_{AC} \sim 10T_K$) amplitude regimes. The onset of non-adiabatic conductance behavior occurs well below prediction, $f \sim T_K$, and becomes more apparent as the frequency nears T_K.

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