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Singular conductance of a Spin-1 quantum dot

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We interpret the recent observation of a zero-bias anomaly in spin-1 quantum dots in terms of an underscreened Kondo effect. Although a spin-1 quantum dots are expected to undergo a two-stage quenching effect, in practice the log normal distribution of Kondo temperatures leads to a broad temperature region dominated by underscreened Kondo physics. General arguments, based on the asymptotic decoupling between the partially screened moment and the leads, predict a singular temperature and voltage dependence of the conductance G and differential conductance g, resulting in $dg/dT \sim 1/T$ and $dG/dV \sim 1/V$. Using a Schwinger boson approach, we show how these qualitative expectations are borne out in a detailed many body calculation.

Keywords : quantum dot, underscreened Kondo effect, large N approach