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NMR spin relaxation rates in the Heisenberg bilayer TIAGO MENDES, UFRJ / UC Davis, NICHOLAS CURRO, RICHARD SCALETTAR, UC Davis, THEREZA PAIVA, RAIMUNDO R. DOS SANTOS, UFRJ — One of the striking features of heavy fermions is the fact that in the vicinity of a quantum phase transition these systems exhibit the breakdown of Fermi-liquid behavior and superconductivity. Nuclear magnetic resonance (NMR) expirements play an important role in the study of these phenomena. Measurements of NMR spin relaxation rates and Knight shift, for instance, can be used to probe the electronic spin susceptibility of these systems. Here we studied the NMR response of the Heisenberg bilayer model. In this model, it is well known that the increase of the interplane coupling between the planes, J_{perp}, supresses the antiferromagnetic order at a quantum critical point (QCP). We use stochastic series expansion (SSE) and the maximum-entropy analytic continuation method to calculate the NMR spin lattice relaxation rate $1/T_1$ and the spin echo decay $1/T_{2G}$ as function of J_{perp}. The spin echo decay, T_{2G} increases for small J_{perp}, due to the increase of the order parameter, and then vanishes abruptly in the QCP. The effects of J_{perp} dilution disorder in the QCP and the relaxation rates are also discussed. This research was supported by the NNSA grant number DE-NA 0002908, and Ciência sem fronteiras program/CNPQ.

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