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Competing ^{1}H Spin Relaxation Mechanisms in Low-Dimensional *$Per_2Pt[mnt]_2$*

ELIZABETH GREEN, J.S. BROOKS, P.L. KUHNS, A.P. REYES, NHMFL, J.A. WRIGHT, S.E. BROWN, UCLA, M. ALMEIDA, ITN, M.J. MATOS, R.T. HENRIQUES, Lisboa, NHMFL TEAM[1], UCLA TEAM[2], ITN TEAM[3], LISBOA TEAM[4] — $Per_2[Pt(mnt)_2]$ is a low-dimensional organic conductor consisting of parallel conducting (*perylene*) and magnetic chains ($Pt[mnt]_2$) which undergo a charge density wave (CDW) and spin-Peierls (SP)-transition, respectively. The conducting chain has been studied extensively, however fundamental questions about the spin-dynamics of the magnetic chain in the SP-state remained. By using ^{1}H NMR, we discovered the low temperature nuclear relaxation rates (T_1^{-1}) display an anomalous upturn at the SP-transition which differs from classical SP-systems. This "bump" is suppressed by magnetic field and coincides with the Curie tail, seen in susceptibility measurements. The field-dependent activation energies, extracted from NMR and susceptibility, reveal two distinct behaviors evidencing coexisting spin systems. At low fields, the spin relaxation mechanism derived from a paramagnetic contribution, possibly unpaired Pt spins, is dominant, but is suppressed above 10T. Hence, the intrinsic SP behavior is recovered for high fields. Furthermore, spectra in the field induced (FICDW) state, up to 33T, reveal an increase in the electronic spin polarization. *DMR-NSF-1005293*

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