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Spin excitations used to uncover the nature of the magnetically ordered ground state of Pr0.5Ca0.5MnO3 RUSSELL EWINGS, TOBY PERRING, ISIS Pulsed Muon & Neutron Source, OLGA SIKORA, Department of Physics, National Taiwan University — We have used time-of-flight inelastic neutron scattering to measure the spin wave spectrum of the canonical half-doped manganite $Pr_{0.5}Ca_{0.5}MnO_3$, in its magnetic and orbitally ordered phase. Comparison of the data, which cover multiple Brillouin zones and the entire energy range of the excitations, with several different models shows that only the CE-type ordered state provides an adequate description of the magnetic ground state. We are able to rule out the Zener polaron and magnetic dimer models as magnetic ground states of the system, the former on the basis of gross features of the observed spin wave spectrum and the latter due to subtle discrepancies between the calculated and observed structure factors at certain positions in reciprocal space.

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