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Single to multiparticle excitations in the itinerant helical magnet CeRhIn₅ CHRIS STOCK, Univ of Edinburgh, J. A. RODRIGUEZ-RIVERA, NIST and Univ of Maryland, K. SCHMALZL, ILL, E. E. RODRIGUEZ, Univ of Maryland, A. STUNAUULT, ILL, C. PETROVIC, BNL — CeRhIn₅ is an itinerant magnet where the Ce³⁺ spins order in a simple helical phase. We investigate the spin excitations in this material using triple-axis neutron spectroscopy and observe sharp spin waves at low energies consistent with previous reports and a nearest neighbour exchange of ~ 1 meV [1]. At higher energies, the fluctuations are heavily damped where the single-quasiparticle excitations are replaced by a momentum and energy-broadened continuum constrained by kinematics of energy and momentum conservation [2]. The delicate energy balance between localized and itinerant characters results in the breakdown of the single-quasiparticle picture in CeRhIn₅. [1] P. Das *et al.* Phys. Rev. Lett **113**, 246403 (2014). [2] C Stock *et al.* Phys. Rev. Lett. **114**, 247005 (2015). [3] T. Park *et al.* PNAS **105**, 6825 (2008).

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