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Scattering continuum and possible fractionalized excitations in RuCl_3

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Honeycomb lattice Mott insulators with strong spin-orbit coupling may realize the Heisenberg-Kitaev model. The magnetic interactions contained in this model are intrinsically frustrated and in some parameter regimes a Kitaev quantum spin liquid (QSL) ground state is anticipated. This QSL state is characterized by fractionalized spin excitations that manifest themselves as broad continua in experiment. I will describe Raman scattering measurements on one such spin-orbit coupled Mott insulator, RuCl_3 . Although this system has a magnetically ordered ground state, the Raman data reveal a continuum of magnetic excitations that persist far above the ordering temperature. The line shape and temperature dependence of this continuum are in fact consistent with the fractionalized excitations expected within the Kitaev model and indicate that RuCl_3 may be close to a QSL ground state.