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Neutron Scattering and Thermodynamic Studies of a Flat Mode in an S=$\frac{1}{2}$ Kagome Ferromagnet[1] ROBIN CHISNELL, DANNA FREEDMAN, MIT, JOEL HELTON, DEEPAK SINGH, NIST Center for Neutron Research, CHRIS STOCK, FRANZ DEMMEL, ROBERT BEWLEY, ISIS Facility - Rutherford Appleton Laboratory, DANIEL NOCERA, YOUNG LEE, MIT — Systems with flat bands provide macroscopic degeneracy that allows for the emergence of interesting strongly correlated phenomena such as the fractional quantum Hall effect. Hopping models on geometrically frustrated lattices with spin-orbit interactions predict the existence of flat, topologically nontrivial bands. Experimental realizations of these systems have proved challenging, as the flat band is often distorted by additional interactions. Cu(1,3-bdc) is a hybrid organometallic compound featuring S=$\frac{1}{2}$ Cu^{2+} ions on a kagome lattice. The magnetic moments order ferromagnetically below T=1.8K. We present neutron scattering and thermodynamic measurements of Cu(1,3-bdc) and note the emergence of a flat magnon band in the ordered phase. The presence of a small Dzaloshinskii-Moriya(DM) interaction along with an applied magnetic field perpendicular to the kagome plane creates a gap between the flat band and lower energy dispersive band. The DM interaction also gives two of the magnon bands, including the flat band, a non-zero Chern number. We explore possible topological properties of these bands.

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