

Abstract Submitted
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Chiral noncoplanar magnetic ordering driven by itinerant electrons on the pyrochlore lattice¹ GIA-WEI CHERN, Department of Physics, University of Wisconsin - Madison — In magnets with strong geometric frustration, the inability of spins to simultaneously satisfy the preferred local correlations leads to an extensive ground-state degeneracy at the classical level. The macroscopic degeneracy is lifted when other perturbations are taken into account. In general, collinear or coplanar magnetic orders are selected by perturbations which preserve the spin-rotational symmetry. Here we show that a complex *noncoplanar* magnetic order with a quadrupled unit cell is stabilized by itinerant electrons on the pyrochlore lattice [1]. Specifically we consider a Kondo-lattice model in which itinerant electrons interact with localized spins via on-site exchange coupling. The electron Fermi ‘surface’ at quarter filling is topologically equivalent to three intersecting Fermi circles. The noncoplanar magnetic order stems from a weak-coupling instability caused by perfect nesting of the Fermi circles. The magnetic structure characterized by a definite handedness also breaks the chiral symmetry. The chiral order might persist without magnetic order in a chiral spin liquid at finite temperatures.

[1] Gia-Wei Chern, Phys. Rev. Lett. **105**, 226403 (2010).

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