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Topological Materials with Intriguing Magnetic Textures.

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The topic of magnetoelectronic properties of topological materials is of high interest from both the fundamental physics and applications viewpoints. Our focus is on systems that exhibit long range magnetic order, investigated via neutron scattering, and how that order tailors the electronic properties. One interesting example is provided by the tetragonal CeAlGe material, where the strong coupling of the magnetic order with the Fermi topology allows a singular angular magnetoresistance to emerge. For YMn 6 Sn 6 , on the other hand, the magnetic structures in the appropriate temperature and magnetic field regime are incommensurate in nature with concomitant strong spin fluctuations that give rise to a large topological Hall effect. This topological Hall effect has a completely new origin based on thermal fluctuations, which naturally develop at elevated temperatures. Both of these examples beautifully demonstrate the synergy between transport measurements, neutron scattering determinations, and theoretical calculations to understand the properties. Finally, we present recent work on systems where the large moment magnetism of the isotropic spin-only Eu 2+ rare earth ions provide platforms for field-induced topological Hall regimes, or coupled charge and spin orders, or a system with an exceptionally high electron mobility that allows an intrinsic spin Moiré superlattice to emerge

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N/A

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