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Solving Multi- q Incommensurate Magnetism in a Europium Triangle Lattice Material

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Recently, centrosymmetric lanthanide metals have been the subject of intense research due to the discovery of skyrmions in materials such as Gd_2PdSi_3 , GdRu_2Si_2 , $\text{Gd}_3\text{Ru}_4\text{Al}_{12}$, EuAl_4 , and EuNiGe_3 . In this talk, I will present work on a europium triangle lattice compound in this family. Through spherical polarimetry using CRYOPAD at ThALES and polarized SANS measurements at D33, we demonstrate the existence of one single- q cycloidal and two multi- q vortex lattice states with unusually low symmetry propagation vectors. These unusual propagation vectors motivated the development of new SANS data visualization and analysis tools. I will also discuss how these states are deeply intertwined with the electronic structure of the material, and what insights this may provide for the design of new multi- q materials.

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