Fractionalized Electrons in a Kagome Ferromagnet

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The kagome lattice is a particularly simple venue for seeing classical and quantum effects of frustration. Theoretical approaches have yielded many interesting conjectures (including for example the possibilities of quantum spin liquids and a fractional quantum Hall effect at zero applied field for ferromagnets) but experiments on real materials containing kagome layers have not validated even relatively straightforward predictions, such as flat bands, especially for metals. This follows because of the three-dimensionality and large unit cells of the materials. I will report on recent progress exploiting both density functional theory[1], transport measurements[2-4], and spectroscopic tools[5,6] towards identifying Weyl nodes, flat bands, and anomalous fractionalized charge in a kagome ferromagnet, Fe_3Sn_2, which undergoes a spin reorientation transition that we visualize using magnetic force microscopy[7].

References

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