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(G*) Dynamic and frozen quantum magnetism in the ground states of triangular lattice magnets YbMgGaO₄, ErMgGaO₄ and YbCoGaO₄ from inelastic neutron scattering

Wednesday, 8 June 2022 11:00 (15 minutes)

The putative quantum spin liquid (QSL) state exhibited by YbMgGaO₄ is largely ascribed to the quasi-2D triangular lattice which the magnetic Yb³⁺ moments decorate in concert with anisotropic exchange and disorder in neighbouring disordered Mg²⁺/Ga³⁺ bilayers [1,2,3]. We present new inelastic neutron scattering (INS) measurements on YbMgGaO₄ as well as its isostructural sister compounds: ErMgGaO₄ and YbCoGaO₄. Each material was synthesized as a phase-pure powder and INS measurements were performed on IN6-Sharp with E_i = 3.1 meV at the Institut Laue-Langevin. We discuss the observed hallmarks of a QSL in YbMgGaO₄ and contrast these with signatures of frozen spin correlations in each of ErMgGaO₄ and YbCoGaO₄ in the INS measurements. The case of YbCoGaO₄ is an interesting one as it displays the interplay between a QSL-like state associated with the Yb³⁺ magnetism, interleaved with a two-dimensional spin glass state originating from the disordered Co²⁺ magnetism.

[1] Paddison, J., Daum, M., Mourigal, M. et al. *Nature Phys* 13, 117–122 (2017)

[2] Li, Y., Adroja, D., Zhang, Q. et al. *Phys. Rev. Lett.* 118, 107202 (2017)

[3] Zhu, Z., Maksimov, P. A., Chernyshev, A. L. et al. *Phys. Rev. Lett.* 119, 157201 (2017)

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