

Tuning Quantum Magnets: Perturb to Reveal

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When cooled down, most magnetic materials form long-ranged structures of the magnetic moments. The situation is markedly different when strong quantum fluctuations are present in low dimensional materials or lattices with highly frustrated networks of spins. Such systems collectively called quantum magnets may have unconventional magnetic structures or even maintain a fluctuating quantum state down to the lowest temperatures.

Oftentimes one of the best ways to reveal these new ground states and excitation is by perturbing such systems. In this talk, I will present several ways to modify the quantum magnets using chemical substitution as well as application of high pressure. In particular, I will show how spectral modifications can be achieved by diluting low dimensional magnets [1] and how application of high pressure leads to new phases in Kitaev materials [2].

Finally, I will discuss how these ideas can be applied more generally for study of spin liquids as well as frustrated magnets close to the metal-insulator transition.

[1] Phys. Rev. Lett. **111**, 067204 (2013); Phys. Rev. **95**, 054409 (2017)

[2] Phys. Rev. B **98**, 104421 (2018); Phys. Rev. Lett. **120**, 237202 (2018)