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Do spin dynamics persist at low temperature in frustrated magnets?

Abstract:

The technique of muon-spin rotation (μ SR) has emerged as one of the most important spectroscopic techniques in condensed matter physics, used to study everything from superconductors to skyrmions. In particular, many magnetically frustrated systems exhibit what is known as persistent spin dynamics (PSD) in μ SR experiments, the origin of which has remained mysterious since their discovery in the 1990s. As the temperature is lowered, the muon-spin relaxation rate rises (as would be expected for the slowing-down of spin fluctuations) but this rate then saturates at low temperature. To explain this phenomenon, I will describe how muons can couple to singlet states and how this can be extended to understand the way muons couple to a variety of frustrated systems. μ SR experiments are usually carried out without resonance, but I will describe a new project which aims to use insights from magnetic resonance and include them into μ SR, thereby extending the reach of the technique.