

## Josephson Effects in Insulating Quantum Spin Systems?

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We propose an experiment in which two magnetic insulators that both show field-induced magnetic-ordering transitions are weakly coupled to one another and are placed into an external magnetic field. If the respective magnetic states can be interpreted as phase coherent Bose-Einstein condensates of magnetic bosonic quasiparticles, one expects the occurrence of Josephson effects. For two coupled magnetic insulators with different critical fields, an alternating quasiparticle current should develop with a leading oscillation frequency  $\omega_{a.c.}$  that is determined by the difference between the critical fields. As a result of the coupling, additional sidebands appear in the frequency spectrum of the coupled device that would be absent without phase coherence. We discuss the primary conditions for such an effect to take place and conclude that its detection is feasible for a proper choice of compounds with suitable and realistic material parameters.<sup>1</sup>

<sup>1</sup>A. Schilling and H. Grundmann, cond-mat/arXiv:1101.1811v4