



TRR 80 Seminar

Am Dienstag, den 3. Juni um 16:00 Uhr
spricht

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über das Thema

Triplon Hall Effect in the $\text{SrCu}_2(\text{BO}_3)_2$

We demonstrate that $\text{SrCu}_2(\text{BO}_3)_2$, well known as a realization of the Shastry Sutherland model, hosts topological triplon bands. The model has an exact dimer singlet ground state. However, the material $\text{SrCu}_2(\text{BO}_3)_2$ has small Dzyaloshinskii Moriya (DM) interactions which admix a triplet component into the ground state. The resulting state has three gapped triplon excitations which form weakly-dispersing bands. An applied magnetic field splits the triplon modes and opens band gaps. Surprisingly, we are left with topological bands with non-zero Chern numbers. $\text{SrCu}_2(\text{BO}_3)_2$ thus supports topologically protected triplonic edge modes and is a magnetic analogue of the integer quantum Hall effect. At a critical value of the magnetic field set by the strength of DM interactions, the triplon bands touch once again and lose their topological character. We show that $\text{SrCu}_2(\text{BO}_3)_2$ realizes a spin-1 generalization of Dirac point wherein three bands touch and exchange Berry curvatures. We predict a strong thermal Hall signal in the topological regime, which can be verified experimentally.

Gäste sind herzlich willkommen!

Der Vortrag findet im Seminarraum S-288 / Physik-Süd, Universität Augsburg statt.

Gastgeber: Prof. Dr. István Kézsmárki