

IFMP Seminar

Date: Tuesday, June 15, 2021, at 14:50

BigBlueButton:

<https://selfservice.zih.tu-dresden.de/l/link.php?m=118900&p=e819ae07> (TUD)

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Speaker: **Xianglin Ke**

Michigan State University

Title: **Propagating spinons and magnons in coupled quantum spin chains**

Abstract: In conventional magnets with magnetic long range order (LRO), low-energy excitations are carried by spin waves, represented by massless bosons called magnons with $S = 1$. However, in one-dimensional (1D) antiferromagnetic quantum spin systems, quantum fluctuations destroy LRO. Their low-energy excitations are spinons, a fractionalized fermion with $S = 1/2$, instead of magnons. In quasi-1D antiferromagnets with quantum spins, magnetic excitations are carried by either magnons or spinons in different energy regimes: they do not coexist independently, nor could they interact with each other. In this seminar, I will present our recent neutron scattering and theoretical studies of a unique quasi-1D quantum spin system, $\text{Cu}_2(\text{OH})_3\text{Br}$, which consists of weakly-coupled, ferromagnetic and antiferromagnetic alternating chains. As a result, this system shows coexistence of two different magnetic quasiparticles: the ferromagnetic chains give rise to conventional magnon excitations, while the antiferromagnetic chains yield spinons. In addition, I will show that these magnetic quasiparticles interact via weak interchain interactions, leading to gap opening of magnetic excitations and asymmetric spectral weight.

Host: D. Inosov