



Weekly Seminar

Spiral Spin-Liquids: Codimension, Topology, and Molecular Excitations

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Time: 3:00 pm, Mar. 27, 2024 (Wednesday)

时间: 2024年3月27日 (周三) 下午3:00

Venue: Room w563, Physics building, Peking University

地点: 北京大学物理楼, 西563会议室

Abstract

A spiral spin-liquid is an exotic type of correlated paramagnetic state where the low energy dynamics consist of collective spiral correlations [1]. A characteristic feature of a spiral spin-liquid is that the propagation vectors of the degenerate spiral ground states form a continuous surface in reciprocal space. Such an unusual yet clearly defined feature has stimulated a strong interest by the community to experimentally identify and understand SSLs in real materials. This talk will present on our recent neutron scattering experiments and numerical simulations on three spiral spin-liquid candidates, focusing on the discovery of a two-codimensional SSL [2] in the effective honeycomb-lattice compound $\text{Cs}_3\text{Fe}_2\text{Cl}_9$ [3] with a possible order-by-disorder transition [6]; the understanding of the emergent topological spin textures in the breathing kagome-lattice compound $\text{Gd}_3\text{Ru}_4\text{Al}_{12}$ [3,4,6]; and the clarification of the origins of molecular excitations in the pyrochlore-lattice compound MgCr_2O_4 [4,5,6].

[1] D. Bergman et al., Nat. Phys. 3, 487 (2007)

[2] X. P. Yao et al., Frontiers Phys. 16, 53303 (2021)

[3] Ishii et al., Phys. Rev. B 103, 104433 (2021)

[3] M. Hirschberger et al., Nat. Commun. 10, 5831 (2019)

[4] K. Tomiyasu et al., Phys. Rev. Lett. 110, 077205 (2013)

[5] X. J. Bai et al., Phys. Rev. Lett. 122, 097201 (2019)

[6] S. Gao et al., unpublished

About the speaker

高尚, 中国科学技术大学物理系特任教授。2013至2017年在瑞士保罗谢勒研究所学习中子散射, 获日内瓦大学物理学博士学位。之后于日本理化学研究所(2018至2020)和美国橡树岭国家实验室(2020至2022)从事中子和X射线散射相关的博士后研究。2022年入职中国科学技术大学。研究方向集中于阻挫磁体, 尤其关注无序磁体中的短程自旋关联。