



### Seminar

## Field-controlled multicritical behavior and emergent universality in a fully frustrated quantum magnet

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**Time: 3:00 pm, June. 19, 2024 (Wednesday)**

**时间: 2024年6月19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

We study the fully frustrated bilayer Heisenberg antiferromagnet to demonstrate that an applied magnetic field creates a novel emergent criticality. The quantum phase diagram contains four states with distinctly different symmetries, all but one pair separated by first-order transitions. We show by quantum Monte Carlo simulations that the thermal phase diagram is dominated by a wall of discontinuities extending between the dimer-triplet phases and the singlet-containing phases. This wall is terminated at finite temperatures by a critical line, which becomes multicritical where the Berezinskii-Kosterlitz-Thouless (BKT) transition of the dimer-triplet antiferromagnet and the thermal Ising transition of the singlet-triplet crystal phase also terminate. The combination of merging symmetries leads to a 4-state Potts universality not contained in the microscopic Hamiltonian, which we interpret within the Ashkin-Teller model.

#### About the speaker

俞榕教授2007年于美国南加州大学物理天文系获得博士学位，之后在美国田纳西大学、美国莱斯大学物理天文系从事博士后研究工作。2013年入职中国人民大学物理系。他主要从事关联电子体系的理论研究，包括量子磁性体系中的相变与临界现象、非常规超导体中的电子关联、超导配对以及自旋动力学等。