

# JITCP Seminar

THE UNIVERSITY OF HONG KONG  
HKU-UCAS JOINT INSTITUTE OF THEORETICAL AND COMPUTATIONAL PHYSICS  
[Thursday afternoon, 4 pm, Zoom (online)]

## Towards Novel Quantum Materials: Design, Synthesis and Characterizations Dr. Ruidan ZHONG

*Shanghai Jiao Tong University and Tsung-Dao Lee Institute*

Quantum materials are materials where the extraordinary effects of quantum mechanics give rise to exotic and often incredible properties. To understand their basic behavior if we are to enable optimization for a specific purpose, discovering novel quantum materials is a primary task for scientists in the field of condensed matter physics and materials science. In this talk, research strategies toward novel quantum materials in experiment will be introduced from the perspective of chemistry, materials science and physics. Such research process leads to fruitful results, and two recent discovered candidates of quantum spin liquid (QSL) will be briefly presented as an example. The first candidate is a geometric frustrated magnet,  $\text{Na}_2\text{BaCo}(\text{PO}_4)_2$ , which is structurally perfect without intrinsic disorder. Experimental results, including magnetization, specific heat, and neutron scattering, have indicated that this compound is an ideal QSL candidate. The second compound,  $\text{BaCo}_2(\text{AsO}_4)_2$ , are believed to be a Kitaev QSL candidate. This is the first time that Kitaev physics are proposed to be realized in 3d-transition-metal honeycomb in experiment. Non-Kitaev interactions can be fully suppressed by low field, yielding nonmagnetic ground state and many other similarities with the well-studied Kitaev QSL  $\alpha\text{-RuCl}_3$ .

### About the speaker:

Ruidan Zhong obtained her PhD degree from Stony Brook University in 2017. She conducted her PhD research at Brookhaven National Laboratory, where she focused on the experimental investigation on quantum materials including high-temperature superconductors and topological materials. After graduation, she moved to Princeton University and worked as a Postdoc with Prof. Robert. Her research interest then was about novel quantum materials exploration with a focus on the magnetism in frustrated magnets. Since 2021 she holds a position in Shanghai Jiao Tong University and Tsung-Dao Lee Institute as a junior faculty. Currently her research focuses on the design, synthesis and characterizations of novel quantum materials.

### Online Zoom Seminar

Thursday, November 24, 2022, 4:00 pm

Meeting ID: 954 9021 6512

Password: 25600

<https://hku.zoom.us/j/95490216512?pwd=WEM1Qzl0MU9DTkgxNEdSVjRDWk5rQT09>

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