THE CHINESE UNIVERSITY OF HONG KONG

Department of Physics

COLLOQUIUM

Neutron Spectroscopy Studies on Kitaev Quantum Magnets

by



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Date: December 6, 2024 (Friday)
Time: 4:00 - 5:00 p.m.
Place: L5, Science Centre, CUHK

(Light refreshments will be served at SCNB 1/F lobby from 3:30 to 3:50 p.m.)

ALL INTERESTED ARE WELCOME
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Abstract

The Kitaev model is an exactly solvable quantum-spin-liquid model defined on a honeycomb lattice with S = 1/2. The key element underlying this model is the bond-anisotropic Kitaev interaction. However, in a spin-only system, it is unrealistic to have such anisotropic interactions. In this talk, I will show that the Kitaev interaction can be realized in a Mott insulator α-$RuCl_3$, which has an effective spin of 1/2 by entangling the spin and orbital degrees of freedom. I will also show that by applying an in-plane magnetic field, the zigzag magnetic order ground state in α-$RuCl_3$ can be completely suppressed, and a quantum-spin-liquid state can be induced. More recently, we extend the Kitaev physics to higher-spin system, where we find in a honeycomb-lattice antiferromagnet $Na_3Ni_2BiO_6$ that there is a profound 1/3 magnetization plateau, which is stabilized by the Kitaev interaction, as evidenced from the neutron spectroscopy. This will also be discussed in the presentation.

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