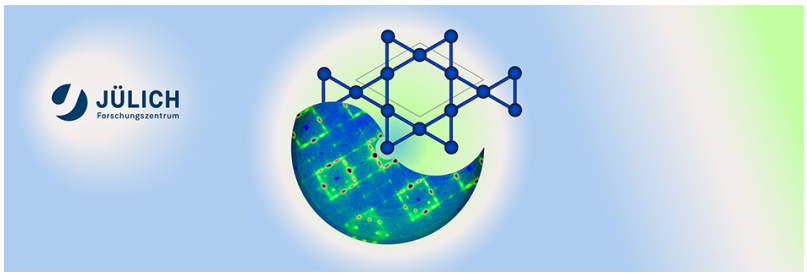


Beitrag ID: **74** Typ: **Invited talk**

# Nodal line spin liquid and fluctuation stabilized order on the face centered cubic antiferromagnet K2IrCl6

*Mittwoch, 8. Oktober 2025 10:30 (30 Minuten)*

Competing interactions in frustrated magnets can result in highly degenerate ground states from which correlated liquid-like states of matter often emerge. In the extreme quantum limit, these degenerate classical states may evolve into quantum spin liquids. The potential for discovering such exotic phases of matter is one reason that frustrated magnets occupy a major area of quantum materials research. However, even when a quantum spin liquid is not realized –as is usually the case –new collective physics often emerges from frustration. In this talk, I will present neutron scattering data on the face centered cubic (FCC) antiferromagnet $K_2IrCl_6$ that provide evidence for a new type of classical spin liquid state: a "nodal line spin liquid" where spins collectively fluctuate within a sub-extensive manifold spanning one-dimensional lines in reciprocal space. The nodal line spin liquid is susceptible to ordering induced by quantum or thermal fluctuations or by long-range exchanges. While each of these selection mechanisms is very weak, they cooperate to stabilize magnetic order at low temperatures. However, proximity to the nodal line spin liquid enhances the effects of quantum fluctuations, so that a semi-classical description of the magnetism in the ordered state of $K_2IrCl_6$ fails qualitatively to capture this excitation spectrum. The results demonstrate a new state of fluctuating matter and show how quantum fluctuations can act counter-intuitively in frustrated systems: instead of destabilizing ordering, at the brink of the nodal spin liquid quantum fluctuations serve to stabilize order despite the extremely weak order-by-disorder selection.

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