



### Weekly Seminar

#### Hidden $SU(2)$ Symmetries, the Symmetry Hierarchy and the Emergent Eight-Fold Way in Spin-1 Quantum Magnets

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**Time: 4:00Pm, Dec. 5, 2018 (Wednesday)**

**时间: 2018年12月5日 (周三) 下午4:00**

**Venue: Room W563, Physics building, Peking University**

**地点: 北京大学物理楼, 西563会议室**

#### Abstract

The largest allowed symmetry in a spin-1 quantum system is an  $SU(3)$  symmetry rather than the  $SO(3)$  spin rotation. We reveal some  $SU(2)$  symmetries as subgroups of  $SU(3)$  that, to the best of our knowledge, have not previously been recognized. Then, we construct  $SU(2)$  symmetric Hamiltonians and explore the ground-state phase diagram in accordance with the  $SU(3) \supset SU(2) \times U(1)$  symmetry hierarchy. It is natural to treat the eight generators of the  $SU(3)$  symmetry on an equal footing; this approach is called the eight-fold way. We find that the spin spectral functions and spin quadrupole spectral functions share the same structure, provided that the elementary excitations are flavor waves at low energies, which serves as a clue to the eight-fold way. An emergent  $S=1/2$  gapless quantum spin liquid is found to coexist with spin nematic order in one of the ground states.

**Reference:** Hui-Ke Jin, Jian-Jian Miao, Yi Zhou, arXiv:1811.0047 (2018)

#### About the speaker

周毅, 1998年本科毕业于清华大学物理系, 2004年1月在清华大学高等研究院获得博士学位。曾在德国马克斯-普朗克-物理中的复杂系统研究所(德累斯顿)、香港科技大学、香港大学、香港中文大学做博士后研究。2009年获得浙江大学教职, 现为浙江大学教授。从事凝聚态物理理论的研究, 涉及超导、磁性、电子关联系统和拓扑系统, 发表论文50余篇。在量子自旋液体、新型超导理论等方面取得有影响的成果, 应邀为《Nature Physics》与《Reviews of Modern Physics》等撰写评论与综述文章。