



清华大学高等研究院

Institute for Advanced Study, Tsinghua University

学术报告

Title: Tuning topological orders by a conical magnetic field in the Kitaev model

Speaker: Qiang-Hua Wang (*Nanjing University*)

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Venue: Conference Hall 322, Science Building, Tsinghua University

Abstract

We show that a conical magnetic field can be used to tune the topological order and hence anyon excitations of the Z_2 quantum spin liquid in the isotropic antiferromagnetic Kitaev model. A novel topological order, featured with Chern number $C=4$ and Abelian anyon excitations, is induced in a narrow range of intermediate fields $H_{c1} \leq H \leq H_{c2}$. On the other hand, the $C=1$ Ising-topological order with non-Abelian anyon excitations, is previously known to be present at small fields, and interestingly, is found here to survive up to H_{c1} , and revive above H_{c2} , until the system becomes trivial above a higher field H_{c3} . The results are obtained by developing and applying a Z_2 mean field theory, that works at finite fields and is asymptotically exact in the zero field limit, and the associated variational quantum Monte Carlo. Evidences against a $U(1)$ spin liquid in the intermediate field regime are also discussed.

About the speaker: 王强华教授，1985-1989年在南京大学少年部(后称基础教育强化部)本科学习，获理学学士学位。1989-1993年在南京大学物理系硕博连读，获理学博士学位，并留校工作。1995-1997年在香港大学做博士后研究工作。2000-2002年在加州大学伯克利分校做访问研究。1993-1995年任南京大学物理系讲师，1995-2002年任副教授，2002-今任教授。2004年获国家杰出青年基金以及教育部霍英东研究基金资助，2006年获教育部长江学者特聘教授。研究领域：强关联电子系统的超导机理与物理性质，泛函重整化群、密度矩阵重整化群及量子蒙特卡洛等数值计算，拓扑绝缘体与拓扑超导体。