



Weekly Seminar

Symmetry protected topological superconductors and superfluids

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Time: 4:00pm, Oct. 29, 2014 (Wednesday)

时间: 2014年10月29日 (周三) 下午4:00

Venue: Room 607, Science Building 5

地点: 理科五号楼607会议室

Abstract

In this talk, I will review recent progress in understanding the intertwining of topology and symmetries in superfluids and superconductors. Owing to the richness of symmetry and well-established knowledge on the bulk, special focus is placed on the superfluid ^3He that is a prototype of symmetry protected topological superfluidity. I will also clarify the generic consequence of the topological superfluidity that Majorana fermions possess Ising spins, non-locality, and non-abelian statistics. This theory is applied to the superfluid ^3He under a time-reversal breaking field, the heavy-fermion superconductor UPt_3 , and the superconducting topological insulator $\text{Cu}_x\text{Bi}_2\text{Se}_3$. Using both the symmetry consideration and microscopic calculation, I unveil the remarkable features of such a symmetry-protected topological phase, including the topological phase transition concomitant with spontaneous symmetry breaking, the anomalous enhancement of spin susceptibility, topological quantum criticality, and much more.

About the Speaker

Mizushima Takeshi got his bachelor degree in 2000, master degree in 2002 and Ph.D in 2005 from Okayama University. From Apr. 2004 to Mar. 2007, he was the research associate in the department of Physics, Okayama University. Then he became the assistant professor. Since Oct. 2014 to present, he has been the associate professor in the Department of Materials Engineering Science, Osaka University.