



复旦大学物理系 物质科学报告

Time: 2:00pm, Tuesday, 2019.11.19

Location: Room C108, Jiangwan Physics Building

Title: Towards Materials Realization of 2D Topological Superconductivity

Speaker: Zhenyu Zhang

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Abstract: The recent discovery of topological insulators as a new class of quantum matter offers appealing schemes for potential definitive realization of topological superconductors and unambiguous detection of Majorana fermions. In this talk, I will attempt to give an overview on the recent advances and latest excitements in this vibrant area, with some of our own stories surrounding topological superconductors squeezed in. Our first focus is on systems that rely on proximity effects; here we will show that proper introduction of dilute magnetic dopants at the interfaces of topological insulators and conventional superconductors can effectively convert the systems into chiral topological superconductors. Next we shift to intrinsic systems, exploring how Rashba spin-orbit coupling and van Hove singularity could induce exotic topological phase transitions within the context of “correlation of correlations”. Beyond such microscopic model studies, we will also use first-principles approaches to identify candidate systems that promise to materialize 2D topological superconductivity. In doing so, we will highlight the importance of interfacial growth science in guiding predictive discoveries of new high-transition-temperature superconductors and topological superconductors.



Prof. Zhenyu Zhang received his B.S. degree from Wuhan University in 1982 and PhD degree from Rutgers University in 1989, both in physics. He was a Distinguished Research Scientist in Oak Ridge National Laboratory and Professor of Physics (Chair of Excellence) at the University of Tennessee, USA before joining USTC in January 2011. He is now a Distinguished Chair Professor at USTC and serves as co-founding Director of the International Center for Quantum Design of Functional Materials (ICQD). His research interests lie in the fields of theoretical understanding of the formation, stability, properties, and potential applications of low-dimensional materials. He is a fellow of the American Physical Society, and has served or currently serves on the editorial boards of several professional journals (including serving on the editorial boards of Chinese Physics Letters and Physical Review Letters).