

MAR16-2015-030045

Abstract for an Invited Paper  
for the MAR16 Meeting of  
the American Physical Society

### **Identification of odd-parity nematic superconductivity in doped topological insulators**

LIANG FU, MIT, Physics Department

I will review our theoretical proposal [1] that  $\text{Cu}_x\text{Bi}_2\text{Se}_3$ , a doped topological insulator that becomes superconducting below  $T_c = 3.8\text{K}$ , may have an odd-parity superconducting order parameter emerging from a strongly spin-orbit-coupled band structure. I will discuss recent experimental discovery of spontaneously rotational symmetry breaking in the superconducting state of  $\text{Cu}_x\text{Bi}_2\text{Se}_3$  [2], which provides strong evidence for a two-component odd-parity order parameter leading to nematic superconductivity [3]. Our theoretical analysis shows that this nematic superconductor is stabilized by spin-orbit coupling [4], exhibits a variety of novel thermodynamic properties [5], and realizes a time-reversal-invariant topological superconductor. [1] L. Fu and E. Berg, PRL 105, 097001 (2010) [2] K. Matano, M. Kriener, K. Segawa, Y. Ando and G. Zheng, arXiv:1512.07086 [3] L. Fu, PRB, 90, 100509 (2014) [4] J. Venderbos, V. Kozii, and L. Fu, arXiv:1512.04554 [5] J. Venderbos, V. Kozii, and L. Fu, to appear