Excitations in Topological Superfluid 3He

After the discovery of topological insulators, the concept of topology permeated the various fields of condensed matter physics. Symmetry of a quantum system plays an intriguing role in close association with topology, expanding the range of topological quantum systems to superconductors/superfluids. Superfliuid 3He, which has been a prime example of symmetry breaking phase transition, is also recognized as a quantum system with various topological nature. In particular, the B-phase is a rare example of 3D time-reversal symmetric topological superfluid. The combination of broken symmetry and topology in the condensate generates diverse excitations in this system. In this talk, we will introduce some of these excitations with a focus on the surface Andreev bound states (SABS) in the B-phase. Growing interest in SABS in the B-phase arises that they are the edge states emerging from the bulk-boundary correspondence. A novel experimental technique employing a MEMS oscillator has been developed to investigate the surfaces excitations. The recent results which exhibit unusual behavior in the damping of the MEMS oscillator and the critical velocity will be discussed.