

**HORIZON POSTDOCTORAL FELLOWSHIP – CONCORDIA UNIVERSITY**

**Project** : Novel collective phenomena in multi-component topological superconductors.

**Description**: Superconductors (SCs) are fascinating quantum materials and the understanding of the mechanism leading to this phenomenon is still an open question, with myriad of experimental details yet to be convincingly sorted out. One of the many striking characteristics of SCs is its collective response. The collective behavior tends to dominate the response of the system to any probe and also provide a great deal of information about the system, and are therefore researched thoroughly.

In the usual spin-based singlet superconductors, however challenging it may be to figure out the mechanism, their collective properties are known: e.g. the presence of Higgs' mode, Leggett modes, Bardasis-Schrieffer modes. Moving to triplet superconductors, they already significantly expand the phase-space of collective modes, but they are also known. We now have a special type of superconductor under discussion: one which has topologically protected Bogoliubov Fermi-surfaces (FSs). Such superconductors are essentially multi-component (they include spin, bands, orbitals, valleys, etc.), and the role these FSs play is not yet understood. We wish to study their role in the context of collective modes of the system. We will formulate the theory to study collective phenomena in multi component systems and answer questions like: What is the effect of these FSs on currently known collective modes? What are the new collective modes induced by these FSs? How can we detect these new modes? How can they be used to advance the understanding of quantum materials?

**Supervisor:** [Dr. Saurabh Maiti](#)

**Deadline:** Position open until filled.

**Eligibility and directions:** Follow instructions here: <https://www.concordia.ca/sgs/postdoctoral-fellows/funding/horizon/descriptions/9012.html>