UNIVERSITY OF TORONTO
FACULTY OF ARTS & SCIENCE | Department of Mathematics

Departmental PhD Thesis Exam

Wednesday, July 16th, 2025 at 10:00 a.m. (sharp)
via Zoom / BA6183

PhD Candidate : Leo Jiang

Supervisor : Joel Kamnitzer

Thesis title : Topology of real matroid Schubert varieties

Abstract

In this thesis we study the topology of real matroid Schubert varieties, which are closures of real linear spaces in products of projective lines. We show that the topology of these varieties is controlled by the combinatorics of real hyperplane arrangements. More precisely, we exhibit homeomorphisms from real matroid Schubert varieties to quotients of zonotopes. Further, this combinatorial model for the topology of the variety can be generalised to define a topological space for any oriented matroid. As a consequence, we are able to compute the fundamental group and integral cohomology of these spaces, obtaining virtual Coxeter groups (in special cases) and signed analogues of the graded Möbius algebra respectively.