Topology of Particle Collisions

Date Friday, February 20

Time 3:45 pm

Location 520 Math

Abstract: Our story is motivated by the configuration space of particles on spheres. In the 1970s, Deligne and Mumford constructed a way to keep track of particle collisions in this space using Geometric Invariant Theory. In the 1980s, this (compactified) moduli space was remarkably used by Gromov and Witten as invariants arising from string field theory. In the 1990s, Kontsevich and Fukaya generalized these ideas when studying deformation quantization to include particles collisions on spheres with boundary.

This talk, using visual brushstrokes, focuses on the topology of real points of particle collisions. Their real analogs can be understood from several viewpoints, from tiling of convex polytopes, to blowups of hyperplane arrangements, to underlying operad structures. In particular, we focus on the (Fulton-MacPherson) compactifications of particles on the Poincare disk, leading to open-closed string field theory.