Department of Mathematics
University of Notre Dame

Olga Chekeres - University of Connecticut

TOPOLOGY SEMINAR

Guest Speaker: Olga Chekeres
University of Connecticut

Date: Tuesday, October 13, 2020
Time: 2:30 PM
Location: Zoom
Zoom Link: notredame.zoom.us/j/97262637721

Lecture Title:
Quantum Wilson Surfaces and Topological Interactions

Abstract

The present work describes a topological quantum field theory of Wilson surfaces. We start with a definition of a Wilson line observable in gauge theories, from which we construct first a Wilson surface observable as a 2-dimensional σ-model. Then a Wilson surface theory is formulated as a separate 2-dimensional topological quantum field theory with a 1-dimensional Hilbert space. It has a Lagrangian of a BF theory with a constraint on the B-field. On a closed surface, the Wilson surface theory defines a topological invariant of the principal G-bundle. The Wilson surface theory can interact with some background gauge theory through the topology of principal G-bundles. We compute explicitly the partition functions of the 2-dimensional Yang-Mills theory interacting with a Wilson surface for the cases $G = SO(3)$, $G = SU(N)/\mathbb{Z}_m$, $G = Spin(4N)/(\mathbb{Z}_2 \oplus \mathbb{Z}_2)$ and obtain a general formula for G any compact connected Lie group.