

# Simons Lecture Series

October 17, 2016 – October 21, 2016, 11:00 a.m.

Boltzmann Lecture Hall, ESI, Boltzmannngasse 9, Vienna

**Dr. Paul Wedrich**

Imperial College, London

## **Knot homologies and higher representation theory**

*Knot homologies are the subjects of a young, fast-paced research field at the intersection of low-dimensional topology, representation theory, algebraic and symplectic geometry and mathematical physics. These lectures will introduce knot homologies in the spirit of Khovanov's categorification of the Jones polynomial, with a focus on their relationship to categorified quantum groups. The topics for the five lectures will be roughly as follows: 1) Introduction: Khovanov homology categorifies the Jones polynomial; 2) the representation theory of quantum groups controls the Jones polynomial and its cousins; 3) quantum groups are categorified by diagrammatic Khovanov-Lauda 2-categories; 4) these categorified quantum groups admit 2-representations; 5) such 2-representations enable a universal construction of (generalisations of) Khovanov homology, leading to uniqueness results and exhibiting additional structure relating different knot homologies.*

Nils Carqueville