Seminar/Talk

Gauge theory and skein modules

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Host: Tamas Hausel

In this talk, I will outline an approach to studying skein modules of 3-manifolds by embedding them into the Hilbert spaces of four-dimensional supersymmetric gauge theories. When the 3-manifold has reduced holonomy, this approach leads to an algorithm for the dimension of the skein module for a general gauge group, expressed as a sum over nilpotent orbits in the Lie algebra, which we also related to and compare with the structure of C^*-fixed loci in the moduli space of Higgs bundles. Surprisingly, the dimensions often differ between Langlands-dual pairs, for which I will provide a physical explanation. This perspective helps to clarify the relation between the gauge-theoretic framework of Kapustin and Witten and other versions of the geometric Langlands program, and explains why the dimensions of skein modules do not exhibit a TQFT-like behavior.

Thursday, May 7, 2026 01:15pm - 03:00pm
Office Bldg West / Ground floor / Heinzel Seminar Room (I21.EG.101)

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