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Langlands duality for critical cohomology of local systems on the 3-torus

Friday, March 7, 2025 11:30 AM (1 hour)

In this talk I will explain a proof of Langlands duality of critical cohomology (cohomological DT invariants) of SLn/PGLn local systems on the 3-torus for prime n. This duality is expected to hold for all compact oriented 3 manifolds. From the physics point of view it arises as S duality of topological twists of 4D N=4 Yang-Mills theories and can be viewed as a Geometric Langlands type statement for 3-manifolds. The main tools of the proof are the use of an exponential map relating CoDT invariants of local systems to "additive" CoDT invariants, a decomposition result called cohomological integrality and a computation of BPS cohomology for the 3-torus. If time permits, I will also explain work in progress concerning applications of the exponential map construction to nonabelian Hodge theory.

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