

Seminar: Mathematical Physics Seminar

When: Wed, April 6, 1:30-2:30pm in REC 225 and on Zoom

Zoom Link: available at <https://www.math.purdue.edu/~ebkaufma/seminar.html>

Speaker: Nathan Haouzi (IAS, Princeton)

Title: What can little strings teach us about the geometric Langlands program?

Abstract: In its simplest incarnation, the geometric Langlands program was defined by Beilinson and Drinfeld in the late 90's as relating, on one side, a flat connection on a Riemann surface, and on the other side, a more sophisticated structure known as a D-module. Since its inception, this conjectured correspondence has been a highly active and fruitful topic of research both for mathematicians and theoretical physicists. In this talk, we will review a generalization of the correspondence known as the quantum q -Langlands program, due to Aganagic-Frenkel-Okounkov, which establishes an isomorphism between q -deformed versions of conformal blocks for a W -algebra on one side, and for a Langlands dual affine Lie algebra on the other side. The physical motivation for this isomorphism is known as little string theory, a powerful framework for studying the correspondence. For instance, we will invoke little string motivations to give a precise mathematical formulation of ramification, or adding punctures on the Riemann surface, in this q -Langlands program. As an application, when the Lie algebra is specialized to be $\mathfrak{su}(2)$, one obtains a new (dual) perspective on recent results of Nekrasov and Tsybaliuk.