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

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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 a Langlands dual affine Lie algebra on the other side. We will then extend the correspondence, and invoke physical arguments from six-dimensional little string to give a precise mathematical formulation of ramification, or adding punctures on the Riemann surface in the q-Langlands program. We will also comment on the CFT limit; for instance, when the Lie algebra is specialized to be sl(2), one obtains a new (dual) perspective on recent results of Nekrasov and Tsymbaliuk.

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