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Title: From instanton moduli space to Vafa-Witten invariants

Abstract: In the 90s, Vafa and Witten studied generating series of "counts" of solutions to certain gauge theoretic equations on a real 4-manifold. For a complex projective surface, the resulting generating series display remarkable modular properties.

A mathematical definition of Vafa and Witten's solution counts was proposed by Tanaka-Thomas using the language of algebraic geometry. I will introduce the problem and explain work in preparation with M. Kool and T. Laarakker in which we express a contribution to the Vafa-Witten invariants in terms of a certain affine quiver variety, the so called "instanton moduli space" of torsion framed sheaves on P^2. We then use results for quiver varieties to obtain new formulas and constraints for Vafa-Witten invariants.