

Northeastern University



Mathematics Department

Geometry, Physics, and Representation Theory Seminar

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Thursday, March 14, 2:50-3:50 pm, Lake Hall 509

From cyclic covers to mirror symmetry

Abstract

We will consider a class of Calabi-Yau varieties given by cyclic branched covers of a fixed semi Fano manifold. The first prototype example goes back to Euler, Gauss and Legendre, who considered 2-fold covers of \mathbb{P}^1 branched over 4 points. Two-fold covers of \mathbb{P}^2 branched over 6 lines have been studied more recently by many authors, including Matsumoto, Sasaki, Yoshida and others, mainly from the viewpoint of their moduli spaces and their comparisons. I will outline a higher dimensional generalization from the viewpoint of mirror symmetry. We will introduce a new compactification of the moduli space cyclic covers, using the idea of abelian gauge fixing and fractional complete intersections. This produces a moduli problem that is amenable to tools in toric geometry, particularly those that we have developed jointly in the mid-90s with S. Hosono and S.-T. Yau in our study of toric Calabi-Yau complete intersections. In dimension 2, this construction gives rise to new and interesting identities of modular forms and mirror maps associated to certain K3 surfaces. The lecture is based on on-going joint work with S. Hosono, T.-J. Lee, H. Takagi, S.-T. Yau, and D. Zhang.