

The Institute of the Mathematical Sciences of the Americas

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Frobenius Structure Conjecture and Moduli of Calabi-Yau Pairs

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I will explain the Frobenius structure conjecture of Gross-Hacking-Keel in mirror symmetry, and an application towards the moduli space of Calabi-Yau pairs. I will show that the naive counts of rational curves in an affine log Calabi-Yau variety U , containing an open algebraic torus, determine in a simple way, a mirror family of log Calabi-Yau varieties, as the spectrum of a commutative associative algebra equipped with a multilinear form.

The structure constants of the algebra are constructed via counting non-archimedean analytic disks in the analytification of U . Furthermore, I will introduce a generalization of the Gelfand-Kapranov-Zelevinsky secondary fan, and show that the mirror family admits a natural compactification and extension over the toric variety associated to the secondary fan, which generalizes the families previously studied by Kapranov-Sturmfels-Zelevinsky and Alexeev in the toric case.

We conjecture that this gives rise to a (nearly uni) versal family of polarized Calabi-Yau pairs (embedded in the moduli space of KSBA stable pairs), and has a surprising consequence that such moduli space is unirational. We prove the stability in dimension two. This is based on arXiv:1908.09861 joint with S. Keel, and arXiv:2008.02299 joint with Hacking and Keel.