

Compactifications of moduli spaces of $K3$ surfaces via mirror symmetry

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Compact moduli spaces of surface-divisor pairs (X, D) such that $K_X + D$ is ample, analogous to the Deligne—Mumford moduli spaces of pointed stable curves, have been constructed by Kollár, Shepherd—Barron, and Alexeev. We will describe the case of $K3$ surfaces using mirror symmetry.

Roughly speaking, the compactification is a toroidal compactification determined by the ample cones of the various birational models of the mirror family (a one parameter family of Picard rank 19 $K3$ surfaces). The universal family near a point of the boundary is determined by a polyhedral subdivision of the 2—sphere together with enumerative data from the mirror family (counts of holomorphic discs) which is encoded in a tropical diagram on the 2—sphere.

This is joint work with Mark Gross, Sean Keel, and Bernd Siebert.

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