Large N duality and the M-theory flop

Rodrigo Barbosa (University of Pennsylvania)

The conifold transition is a process that connects string theories defined on topologically distinct Calabi-Yau manifolds. Mathematically, it consists of a degeneration combined with a resolution of singularities. Gopakumar and Vafa [GV] studied this transition in the presence of branes, predicting a relationship between open and closed Gromov-Witten invariants on the two geometries. On the other hand, the transition has been lifted to a smooth process in M-theory, called the M-theory flop [Ach], [AMV], [AW].

It is natural to ask if similar pictures can be obtained by lifting the branes to the M-theory flop. We will discuss a strategy to do so, which is in line with Joyce's recent paper on G_2 Gromov-Witten invariants [Joy]

References

[Ach] B. Acharya, *On realising N= 1 Super Yang-Mills in M theory*, `https://arxiv.org/abs/hep-th/0011089`

[AMV] M. Atiyah, J. Maldacena, C. Vafa, *An M-theory Flop as a Large N Duality*, `https://arxiv.org/pdf/hep-th/0011256`

[AW] M. Atiyah, E. Witten, *M-theory Dynamics on a Manifold of G_2 holonomy*, `https://arxiv.org/abs/hep-th/0107177`

[GV] R. Gopakumar, C. Vafa, *On the Gauge Theory/Geometry Correspondence*, `https://arxiv.org/abs/hep-th/9811131`

[Joy] D. Joyce, *Conjectures on counting associative 3-folds in G_2-manifolds*, `https://arxiv.org/abs/1610.09836`