GEOMETRICAL MCKAY CORRESPONDANCE

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Abstract: A Calabi-Yau orbifold is locally modelled on $\mathbb{C}^n/G$ where G is a finite subgroup of $SL(n,\mathbb{C})$. One way to handle this type of orbifolds is to resolve them using a crepant resolution of singularities. We are interested in studying the topology of the crepant resoltion. This can be expressed in terms of the finite group G via the McKay Correspondence.

Open Problems: In dimension $n = 3$, a crepant resolution always exists. Such a resolution is not unique, but any two are related by flops. We would like to completely describe the topology of such a crepant resolution. We do know that all the crepant resolutions have the same Euler and Betti numbers: the *stringy* Betti and Hodge numbers of the orbifold.

However, nothing is known about the multiplicative structure in cohomology or K-theory. One would like to have a complete description of the multiplicative structure in cohomology for the crepant resolution given by Nakamura's G-Hilbert scheme, and then describe how this changes when we perform flops.

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