

## **Families of ADE singularities, simultaneous resolutions and 5d QFT's**

Five-dimensional quiver gauge theories with eight supercharges ( $N=1$ ,  $d=5$ ) can be engineered by putting M-theory on non-compact singular Calabi-Yau (CY) varieties. This paradigm has been used originally in [1] to build Seiberg's SCFT's [2] as their UV fixed points.

In literature, a large focus has been put on toric CY's. This project will deal with a different class of CY threefolds, namely families of ADE singularities: the ALE fiber develops an ADE singularity at some special point of the complex one dimensional base; on top of this a set of spheres collapse generating the singularity on the fiber. A base change is chosen such that the degeneration of the fiber leads to a singularity of the threefold that is resolved by (simultaneously) blowing up a subset of the collapsed spheres.

These singular manifolds correspond to rank-zero 5d SCFT. They may be important as building blocks of more complicated SCFT's. The aim of this project is to characterise such rank-zero theories. In particular, the Higgs Branch of its moduli space will be studied, determining whether the SCFT is interacting or only a (maybe trivial) discrete quotient of free hypermultiplets.

### **REFS**

[1] K. A. Intriligator, D. R. Morrison, and N. Seiberg, "Five-dimensional supersymmetric gauge theories and degenerations of Calabi-Yau spaces," Nucl. Phys. B497 (1997) 56–100, hep-th/9702198.

[2] N. Seiberg, "Five-dimensional SUSY field theories, nontrivial fixed points and string dynamics," Phys. Lett. B388 (1996) 753–760, hep-th/9608111.

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