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# Parameter space of quiver gauge theories

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**Abstract**

Placing a set of branes at a Calabi–Yau singularity leads to an $\mathcal{N} = 1$ quiver gauge theory. We analyze $F$-term deformations of such gauge theories. A generic deformation can be obtained by making the Calabi–Yau non-commutative. We discuss non-commutative generalizations of well-known singularities such as the Del Pezzo singularities and the conifold.

We also introduce new techniques for deriving superpotentials, based on quivers with ghosts and a notion of generalized Seiberg duality. The curious gauge structure of quivers with ghosts is most naturally described using the BV formalism. Finally we suggest a new approach to Seiberg duality by adding fields and ghost-fields whose effects cancel each other.

## 1 Parameter space of quiver gauge theories

One of the most reliable ways to engineer a gauge theory from string theory is by placing a set of D-branes in some background geometry. If we require the gauge theory to be four-dimensional with $\mathcal{N} = 1$ supersymmetry, then up to dualities one typically has to look at D-branes filling four flat dimensions and

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