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Global Embeddings for Branes at Toric Singularities and Moduli Stabilization

We discuss recent work on the realization of gauge theories from D3-branes at toric singularities in compact Calabi-Yau manifolds. In particular, we show how a new type of Euclidean D3-brane instanton supported on a non-Spin four-cycle in type IIB orientifolds can give rise to a non-perturbative contribution to the superpotential. This allows the Kähler moduli to be stabilized consistent with the assumption that the four-cycle vanishes for the toric singularity, while the overall volume of the Calabi-Yau manifold is exponentially large.