

Phenomenology of D-branes at toric singularities

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We discuss general properties of D-brane model building at toric singularities. Using dimer techniques to obtain the gauge theory from the structure of the singularity, we extract results on the matter sector and superpotential of the corresponding gauge theory. We show that the number of families in toric phases is always less than or equal to three, with a unique exception being the zeroth Hirzebruch surface. With the physical input of three generations we find that the lightest family of quarks is massless and the masses of the other two can be hierarchically separated. We compute the CKM matrix for explicit models in this setting and find the singularities possess sufficient structure to allow for realistic mixing between generations and CP violation.

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