

What happens when conifold transitions occur at the conifold singularities associated with matter generation in F-theory?

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A conifold is a singular Calabi-Yau 3-fold of the simplest type, and has played important roles in various aspects of string theory. In fact, in F-theory, conifold singularities are quite commonplace; conifold singularities typically appear, in “split models”, in most places where charged matter is generated. We show that the split/non-split transition is, except in certain exceptional cases, a conifold transition from the resolved to the deformed side, associated with the conifold singularities emerging where the codimension-one singularity is enhanced to D_{2k+2} ($k \geq 1$) or E_7 . This clarifies the origin of nonlocal matter in the non-split models, which has been a mystery for many years.

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