# Supergravity anomaly equations from modularity of Calabi–Yau threefolds

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**Abstract**

F-theory compactifications on elliptically fibered Calabi–Yau threefolds give rise to six-dimensional N=(1,0) supergravity theories. Consistency of these theories requires the cancellation of gravitational, gauge, and mixed anomalies, leading to nontrivial algebraic relations between classical intersection data and enumerative invariants associated with curve classes in the fiber. The Gromov–Witten theory of fiber curve classes is naturally encoded by quasi-Jacobi forms, whose modular transformation properties determine the Green–Schwarz anomaly cancellation conditions of the associated F-theory models. Within this class of string compactifications, these anomaly cancellation conditions follow automatically from the holomorphic anomaly equations of topological string theory.

**Keywords:** F, theory, Calabi, Yau threefolds, Anomaly cancellation, Topological String Theory

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