

**Klemm, Albrecht; Manschot, Jan; Wotschke, Thomas****Quantum geometry of elliptic Calabi-Yau manifolds.** (English) Zbl 1270.81180

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Summary: We study the quantum geometry of the class of Calabi-Yau threefolds, which are elliptic fibrations over a two-dimensional toric base. A holomorphic anomaly equation for the topological string free energy is proposed, which is iterative in the genus expansion as well as in the curve classes in the base.  $T$ -duality on the fibre implies that the topological string free energy also captures the BPS-invariants of  $D4$ -branes wrapping the elliptic fibre and a class in the base. We verify this proposal by explicit computation of the BPS invariants of 3  $D4$ -branes on the rational elliptic surface.

Reviewer: [Reviewer \(Berlin\)](#)**MSC:**

- [81T30](#) String and superstring theories; other extended objects (e.g., branes) in quantum field theory
- [81T50](#) Anomalies in quantum field theory
- [14D21](#) Applications of vector bundles and moduli spaces in mathematical physics (twistor theory, instantons, quantum field theory)
- [53D45](#) Gromov-Witten invariants, quantum cohomology, Frobenius manifolds
- [14N35](#) Gromov-Witten invariants, quantum cohomology, Gopakumar-Vafa invariants, Donaldson-Thomas invariants (algebraic-geometric aspects)
- [14M25](#) Toric varieties, Newton polyhedra, Okounkov bodies
- [14J30](#) 3-folds
- [14J32](#) Calabi-Yau manifolds (algebraic-geometric aspects)

Cited in **33** Documents**Full Text:** [DOI](#)