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$N = 1$ mirror symmetry and open/closed string duality. (English) Zbl 1022.81046
Adv. Theor. Math. Phys. 5, No. 2, 213-242 (2001).

Summary: We show that the exact $\mathcal{N} = 1$ superpotential of a class of four-dimensional string compactifications is computed by the closed topological string compactified to two dimensions. A relation to the open topological string is used to define a special geometry for $\mathcal{N} = 1$ mirror symmetry. Flat coordinates, an $\mathcal{N} = 1$ mirror map for chiral multiplets and the exact instanton corrected superpotential are obtained from the periods of a system of differential equations. The result points to a new class of open/closed string dualities which map individual string world-sheets with boundary to ones without. It predicts an mathematically unexpected coincidence of the closed string Gromov-Witten invariants of one Calabi-Yau geometry with the open string invariants of the dual Calabi-Yau.

MSC:

- [81T30](#) String and superstring theories; other extended objects (e.g., branes) in quantum field theory Cited in **29** Documents
- [83E30](#) String and superstring theories in gravitational theory
- [32Q25](#) Calabi-Yau theory (complex-analytic aspects)
- [14N35](#) Gromov-Witten invariants, quantum cohomology, Gopakumar-Vafa invariants, Donaldson-Thomas invariants (algebraic-geometric aspects)

Keywords:

topological string compactified to two dimensions; Gromov-Witten invariants; Calabi-Yau geometry

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