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Knot invariants and topological strings. (English) Zbl 1036.81515
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Summary: We find further evidence for the conjecture relating large N Chern-Simons theory on S^3 with topological string on the resolved conifold geometry by showing that the Wilson loop observable of a simple knot on S^3 (for any representation) agrees to all orders in N with the corresponding quantity on the topological string side. For a general knot, we find a reformulation of the knot invariant in terms of new integral invariants, which capture the spectrum (and spin) of M2 branes ending on M5 branes embedded in the resolved conifold geometry. We also find an intriguing link between knot invariants and superpotential terms generated by worldsheet instantons in $N = 1$ supersymmetric theories in 4 dimensions.

MSC:

- 81T45 Topological field theories in quantum mechanics
- 57M27 Invariants of knots and 3-manifolds (MSC2010)
- 81T30 String and superstring theories; other extended objects (e.g., branes) in quantum field theory

Cited in **2** Reviews
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Full Text: [DOI](#) [arXiv](#)

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