

Floer theory for negative line bundles via Gromov-Witten invariants

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Abstract:

Consider the total space of a negative line bundle L over a closed symplectic manifold. We prove that the quotient of quantum cohomology by the kernel of a power of quantum cup product by the first Chern class of L is isomorphic to symplectic cohomology. For example, for $O(-1)$ over $\mathbb{C}P^m$, the total space is the blow-up of \mathbb{C}^{m+1} at the origin and the symplectic cohomology has rank m . In general, the symplectic cohomology vanishes if and only if the first Chern class of L is nilpotent in quantum cohomology. We also deduce a Kodaira vanishing theorem and a Serre vanishing theorem for symplectic cohomology.