UNIVERSITY OF CALIFORNIA, SANTA BARBARA

Geometry, Topology, and Physics Seminar

The topology and geometry of the Seiberg-Witten curve

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Friday, October 5, 2007, 4:00 p.m.
Room 6635 South Hall

Abstract: We show that the Seiberg-Witten family of elliptic curves defines a four-dimensional, Jacobian rational elliptic surface Z over the u-plane with boundary whose signature equals minus the number of massive hypermultiplets. The family of the stable semiclassical BPS states defines a unique flat holomorphic line bundle on Z. We also construct rank-two holomorphic $SU(2)/\mathbb{Z}_2$-bundles and show that the central charges of the corresponding quantum states are half the charges of the BPS states.

We show that the local anomaly of the determinant line bundle of the $\bar{\partial}$-operator along the fiber of Z vanishes. We determine the non-trivial global anomaly as the holonomy of the determinant section and the relation to the signature of Z. Moreover, we show that the determinant line bundle extends across the nodal fibers of Z. The extension introduces current contributions to the curvature of the determinant line bundle at the points in the u-plane where the stable BPS states become massless.

Information about future meetings of this seminar can be found at
http://www.math.ucsb.edu/~malmendier/GTPseminar/