



GEOMETRY, TOPOLOGY, AND PHYSICS SEMINAR

The geometry of the Seiberg-Witten curve and BPS states

Andreas Malmendier
UCSB

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Abstract: The moduli spaces of vacua for the topological $\mathcal{N} = 2$ supersymmetric $SU(2)$ gauge theories on CP^2 with doublet hypermultiplets are Jacobian rational elliptic surfaces over CP^1 (with an analytical marking). We review how the number and type of the singular fibers of the moduli spaces vary with the number and masses of the additional matter fields. The period bundle of the elliptic surface defines a rank-two $SL(2, \mathbb{Z})$ bundle equipped with a special Kaehler connection. The bundle contains a flat submanifold which intersect each fiber in a full integer lattice; this is the charge lattice of the BPS states. The spectrum of the stable semi-classical BPS states defines a unique flat holomorphic line bundle on the rational elliptic surface. Finally, we will review the construction of the line of marginal stability separating the strong coupling BPS spectrum from the semi-classical.