Monopoles and the relation between Seiberg-Witten and Donaldson invariants

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Abstract

Non-abelian monopoles are a natural generalization of Seiberg-Witten monopoles in four-manifold topology. It is strongly suspected that the framework of non-abelian monopoles will lead to a purely mathematical proof of Witten's expression for Donaldson invariants in terms of Seiberg-Witten invariants. Witten had derived this formula in 1994 by quantum-field theoretic arguments using a completely different paradigm. In this talk we shall discuss our recent progress towards a proof of Witten's conjecture using non-abelian monopoles.