



GEOMETRY, TOPOLOGY, AND PHYSICS SEMINAR

3D $N=4$ Supersymmetric Gauge Theories and Hyperkähler Metrics

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Abstract: Seiberg and Witten famously determined the dynamics of four dimensional gauge theories with $N=2$ supersymmetry using constraints from low energy effective field theory. Compactification to three dimensions yields a sigma model with $N=4$ supersymmetry and a hyperkähler manifold as its target space. We describe how the spectrum of BPS instantons is encoded in the hyperkähler metric and Hitchin's construction of hyperkähler metrics using twistor methods. These techniques provide the foundation for Gaiotto, Moore, and Neitzke's recent work on the Kontsevich-Soibelman wall-crossing formula for BPS degeneracies.