



## Theory Seminar

### "Constructive Wall-Crossing & Seiberg-Witten"

In string theory, geometry and quantum states are sometimes tightly connected. The wall-crossing problem is one example, where (non-)existence of so-called calibrated cycles can be figured out by solving relatively simple class of Schroedinger problems, or vice versa.

We start with a one-slide review of the Kontsevich-Soibelman (KS) solution to the mathematical side of the wall-crossing problem and then proceed to direct and comprehensive physics counting of BPS states in the context of Seiberg-Witten theory. We point out several subtleties, missed by previous such attempts, and provide a universal index formulae from the semiclassical soliton viewpoint. Newly illuminated are how field theory index, called protected spin character, is related to the equivariant index of the low energy quantum mechanics of such BPS states, and also the origin of rational invariant from quantum Bose and Fermi statistics of identical particles. In the end, this physical and constructive approach can be shown to be equivalent to the proposed KS solution.

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