

On Supersymmetric Interface Defects, Brane Parallel Transport and Higgs-Coulomb Duality

Monday, May 31, 2021 7:00 PM (1h 15m)

We concentrate on a treatment of a Higgs-Coulomb duality as an absence of manifest phase transition between ordered and disordered phases of 2d $N=(2,2)$ theories. We consider these examples of QFTs in the Schrödinger picture and identify Hilbert spaces of BPS states with morphisms in triangulated Abelian categories of D-brane boundary conditions. As a result of Higgs-Coulomb duality D-brane categories on IR vacuum moduli spaces are equivalent, this resembles an analog of homological mirror symmetry. Following construction ideas behind the Gaiotto-Moore-Witten algebra of the infrared one is able to introduce interface defects in these theories and associate them to D-brane parallel transport functors. We concentrate on surveying simple examples, analytic when possible calculations, numerical estimates and simple physical picture behind curtains of geometric objects. Categorification of hypergeometric series analytic continuation is derived as an Atiyah flop of the conifold. Finally we arrive to an interpretation of the braid group action on the derived category of coherent sheaves on cotangent bundles to flag varieties as a categorification of Berry connection on the Fayet-Iliopolous parameter space of a sigma-model with a quiver variety target space. The talk is based on arXiv:2105.07602

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