

Algebraic Geometry

Homological projective duality for (anti)-symmetric rank loci

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Kuznetsov’s theory of homological projective duality relates the derived categories of complete intersections in a smooth variety X to complete intersections in a different variety Y , the “homological projective dual of X ”. In joint work with Ed Segal, we compute Y when X is the space of rank k (anti-)symmetric $(n \times n)$ -matrices, for k and n satisfying a parity condition. Here X is singular and must be replaced by a non-commutative/categorical resolution—luckily such a resolution has recently been constructed by Spenko and Van den Bergh.

Our result is motivated by work in physics by Hori, who has proposed a duality between certain pairs of $2d$ $(2, 2)$ -supersymmetric gauge theories with non-abelian gauge groups. Our main statement follows from considering the categories of B -branes associated with such theories (which in our case is interpreted as the non-commutative resolution of X) and extracting from the proposed physical equivalence an equivalence of B -brane categories.

This is joint work with Ed Segal, University of Oxford.