

In this talk we consider auto-equivalences of the bounded derived category $D(X)$ of coherent sheaves on a smooth projective complex variety X . By a result of Orlov, any such auto-equivalence induces an (ungraded) automorphism of the singular cohomology $H(X, \mathbb{Q})$. If X is a K3 surface, then work of Mukai, Orlov, Huybrechts, Macrì and Stellari completely describes the image of the map $\rho_X : \text{Aut } D(X) \rightarrow \text{Aut}(H(X, \mathbb{Q}))$. We will study the image of ρ_X for higher-dimensional hyperkähler varieties. An important tool is a certain Lie algebra acting on $H(X, \mathbb{Q})$, introduced by Verbitsky, Looijenga and Lunts. We show that this Lie algebra is a derived invariant, and use this to study the image of ρ_X .