

Abstract

Birational geometry is the central topic in algebraic geometry. It aims to classify algebraic varieties up to isomorphism on dense open subsets. On the other hand, the bounded derived category of coherent sheaves $D^b(X)$ serves as an important invariant of an algebraic variety X . In their seminal work in 1995, Bondal and Orlov proved that if X is a smooth projective variety with (anti-)ample canonical bundle, then $D^b(X)$ completely determines X . They further conjectured that if X and Y are related by a flop (a kind of birational surgery), then $D^b(X)$ is equivalent to $D^b(Y)$. The conjecture was verified by Bondal and Orlov in certain special cases and was later proved in dimension 3 by Bridgeland. In this talk, I will begin with the ABCs of derived category of coherent sheaves and aims to explain the Bridgeland's proof of the Bondal-Orlov conjecture.