From Yang-Mills and Yang-Baxter equations to derived birational geometry

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摘要： Chen-Ning Yang is not only one of the greatest physicists of the 20th century but also made crucial contributions to mathematics by introducing the Yang-Mills and Yang-Baxter equations. We start by introducing the relationship between the two equations and quiver varieties and quantum groups. Then we will introduce its interaction with the Cohomological Hall algebra and categorification and some of my progress. We will explain the surprising fact that to study the categorification of quantum loop groups, we need to understand a basic math question: the interaction between the intersection theory and birational transformations.