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TITLE: Calabi-Yau Duality And Hopf Algebras

ABSTRACT: Calabi-Yau algebras were introduced by Ginzburg in 2006. In the representation theory of algebras they are used to construct additive categorifications of cluster algebras using Amiot's generalised cluster categories. In geometry they are used to construct resolutions of singularities using Van den Bergh's machinery of non commutative crepant resolutions. A connection between the two worlds is that, sometimes, the category of singularities of a singular variety is close to being a generalised cluster category. Many examples arise from the action of a finite subgroup of SL(3) on the 3-dimensional complex vector space and from the above point of view the semi-direct product of the algebra of polynomials in 3 variables by the action of this group plays a prominent role. This semi-direct product is a particular case of a more general construction where the group (algebra) is replaced by a Hopf algebra. The talk will discuss the homological properties related to Calabi-Yau duality of the semi-direct product of Calabi-Yau (dg) algebras with Hopf algebras. If time permits, some applications of this construction to representation theory will be presented.