

Topological String on Non-Commutative Resolutions

Based on a project with Sheldon Katz, Thorsten Schimannek and Eric Sharpe we describe a simple example of a non-commutative resolution namely the one of a singular double cover of P^3 . This exhibits 84 nodes whose small blow ups give rise to torsion classes in $H_2(\hat{M}, Z)$. The torsion classes support a non-trivial B-field and can be described in terms of non-commutative geometry. We argue that this geometry corresponds to the Landau-Ginzburg phase of the complete intersection of four quadrics in P^7 . Like the mirror of the double cover of P^3 the mirror of the latter has a one parameter hyper-geometric Picard-Fuchs equation, albeit with a second point of maximal unipotent monodromy. It is this second MUM point that yields the B-model description of the non-commutative resolution and allows detailed studies of the higher genus BPS invariants on the non-commutative resolution which are obtained from the wave function transform of the standard string partition function Z at the first MUM point. We provide some geometric checks for the BPS states and some implications for the arithmetic understanding of one parameter families that is recently developed.

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