Beraldo, Dario
The center of the categorified ring of differential operators. (English) [Zbl 07357366]

Summary: Let \( \mathcal{Y} \) be a derived algebraic stack satisfying some mild conditions. The purpose of this paper is three-fold. First, we introduce and study \( \mathbb{H}(\mathcal{Y}) \), a monoidal DG category that might be regarded as a categorification of the ring of differential operators on \( \mathcal{Y} \). When \( \mathcal{Y} = \text{LS}_G \) is the derived stack of \( G \)-local systems on a smooth projective curve, we expect \( \mathbb{H}(\text{LS}_G) \) to act on both sides of the geometric Langlands correspondence, compatibly with the conjectural Langlands functor. Second, we construct a novel theory of D-modules on derived algebraic stacks. In contrast to usual D-modules, this new theory, to be denoted by \( \mathcal{D}^{\text{der}} \), is sensitive to the derived structure. Third, we identify the Drinfeld center of \( \mathbb{H}(\mathcal{Y}) \) with \( \mathcal{D}^{\text{der}}(L\mathcal{Y}) \), the DG category of \( \mathcal{D}^{\text{der}} \)-modules on the loop stack \( L\mathcal{Y} := \mathcal{Y} \times_{\mathcal{Y} \times \mathcal{Y}} \mathcal{Y} \).

MSC:
14D24 Geometric Langlands program (algebro-geometric aspects)
14F05 Sheaves, derived categories of sheaves, etc. (MSC2010)
14F10 Differentials and other special sheaves; D-modules; Bernstein-Sato ideals and polynomials
18F99 Categories in geometry and topology

Keywords:
derived algebraic geometry; coherent sheaves; formal completions; Hochschild cohomology; DG categories; Drinfeld center; D-modules

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References:

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