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Integral geometry methods on deformed categories to geometrical Langlands ramifications in field theory. (English) Zbl 1317.53115

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Summary: Some derived categories and their deformed versions are used to develop a theory of the ramifications of fields studied in the geometrical Langlands program to obtain the correspondences between moduli stacks and solution classes represented cohomologically under integral geometry methods, more specific, under use of the Penrose transform framework. The presented work proposes the derived categories in geometrical Langlands ramifications problem as a special characterization of the ramified fields whose ramifications can be identified as degenerated cycles corresponding to orbits of twisted $\mathcal{D}$-modules of a certain moduli space that can be induced by an appropriate Zuckerman functor obtained by a generalized Penrose transform developed on derived categories of the moduli space $\mathcal{M}_{Flat}(G,C)$, obtaining classes of objects in a moduli space $\mathcal{M}_{Higgs}(G,C)$. Using induced cohomology on generalized G-modules generalized versions of Verma modules are identified corresponding to three categories that have been identified as classes of a Hecke category $\mathcal{H}_{G^{\wedge},\infty}$, and that classify the three type solutions in the field theory.

MSC:

53D37 Symplectic aspects of mirror symmetry, homological mirror symmetry, and Fukaya category
53C65 Integral geometry
11R39 Langlands-Weil conjectures, nonabelian class field theory
14D24 Geometric Langlands program (algebro-geometric aspects)
83C60 Spinor and twistor methods in general relativity and gravitational theory; Newman-Penrose formalism
11S15 Ramification and extension theory

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