

Semi-classical asymptotic for determinants of operators almost elliptic with parameter

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Abstract

We consider a class of 1-parameter families of elliptic operators, called operators almost elliptic with parameters, which contains, in particular, the Witten deformation of the Laplacian. We show that the determinant of such an operator is a sum of a computable term and a function which has a nice asymptotic expansion. This result generalizes a theorem of Burghlea, Friedlander and Kappeler on asymptotic expansion of operators elliptic with parameter. Our result gives a strong tool for studying analytic and holomorphic torsions of compact manifolds. In particular, we obtain a new proof of Ray-Singer conjecture.