Research Highlight: Twisting index theoretical modular invariants by projective vector bundles

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Elliptic genera is an index theoretical topological invariants for differentiable manifolds, taking values in modular forms. It is standing on the intersection of analysis, geometry and topology of manifolds as well as infinite dimensional Lie algebra, number theory and supersymmetric quantum field theory. Motivated by the classical work of Mathai-Melrose-Singer [MMS] on projective index theorem, in this paper we study the twisting of elliptic genera by projective vector bundles and give two applications: (1) obtain a twisted version of the celebrated Alvarez-Gaume-Witten miraculous anomaly cancellation formula; (2) construct modular invariants for general pseudodifferential operators on manifolds rather than Dirac operators.

References:

[MMS] V. Mathai, R.B. Melrose and I.M. Singer, Fractional Analytic Index, J. Differential Geom., 74 no. 2 (2006) 265–292.

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