

Vafa-Witten inequality and Poincaré duality in noncommutative geometry

Raphael Ponge, Seoul National University

Abstract:

The inequality of Vafa-Witten provides us with a bound on the first eigenvalue of a Dirac operator with coefficient in any Hermitian vector bundle.

The remarkable feature of this inequality is the fact that the bound depend only on the manifold, not on the datum of the Hermitian vector bundle. In the framework of noncommutative geometry the role of manifolds is played by spectral triples. In order to deal with some "type III" geometric situations (e.g., non-isometric group actions on manifolds) Connes-Moscovici introduced "twisted spectral triples". The main aim of this talk is to present a version of Vafa-Witten inequality for twisted spectral triples, including twisted spectral on the noncommutative torus associated to conformal weights. An important ingredient of the proof is a version of Poincaré duality for twisted spectral triple. (Joint work with Hang Wang, Mathematical Science Center, Tsinghua University, Beijing).