

04. Februar 2015

L^2 invariants and local index theorems for families of cocompact manifolds

Sara Azzali

In this talk, we are interested in local index formulae for families of manifolds with a cocompact group action. We work in the so called L^2 setting, which means that we are renormalising by the Neumann dimension given by the fibrewise group action. We want to apply Bismut's heat equation approach in this setting in order to obtain, for families of signature operators, an L^2 -index formula at the level of differential forms of the parameter space, and in order to define L^2 -eta (and L^2 -torsion) forms. To do so, we study the large time limit of the heat operator for a superconnection of Bismut Lott type. We prove that in this case there exists a way to carefully estimate all the terms appearing in the Volterra expansion and compute explicitly the large time limit of the heat operator, without imposing extra regularity assumption on the spectrum. With some extra regularity conditions (involving the determinant class or the positivity of the Novikov-Shubin invariants) we prove that the L^2 eta form for the family of signature operators is well defined and obtain the local index formula. Joint work with Sebastian Goette and Thomas Schick.