The Witten deformation on singular spaces

Ursula Ludwig, Université Côte d'Azur

Abstract:
The aim of this talk is to explain the generalisation of the Witten deformation to certain singular spaces. We will explain the case of singular spaces with conical singularities equipped with a radial Morse function as well as the case of singular algebraic complex curves equipped with a stratified Morse function in the sense of Goresky and MacPherson. A first result in both situations is the proof of the Morse inequalities for the L^2-cohomology (or equivalently the intersection cohomology). A much stronger result is the generalisation of the comparison between the so called Witten complex and an appropriate singular Morse-Thom-Smale complex.

The Witten deformation on singular spaces with isolated conical singularities via radial Morse functions is an important ingredient in the generalisation of the Cheeger-Müller theorem to these spaces, following the approach of Bismut and Zhang in the smooth case. Time permitting, we will also address this question.