Algebraic models for Sasakian manifolds and weighted-homogeneous surface singularities

Abstract: Let M be a smooth manifold supporting an almost-free action by a compact, connected Lie group. Under a partial formality assumption on the orbit space and a regularity assumption on the characteristic classes of the action, I will describe a commutative differential graded algebra model for M, which enjoys commensurate finiteness and partial formality properties. The existence of this model has various implications on the structure of the cohomology jump loci and the representation varieties of the fundamental group of M. I will illustrate the general theory with motivating examples coming from the topological study of Sasakian manifolds and of weighted-homogeneous, isolated surface singularities. This is joint work with Stefan Papadima (arXiv:1511.08948).