

Kevin Langlois

Title: Intersection cohomology and torus actions of complexity one

Abstract: (Joint work with Marta Agustín Vicente) Intersection cohomology is a tool that allows to describe the topology of singularities. In this talk, we focus on the calculation of the (rational) intersection cohomology Betti numbers of a complex complete normal algebraic varieties with a torus action of complexity one (i.e., an action of an algebraic torus whose general orbits are of codimension one). This class of algebraic varieties encompasses the complete toric varieties (by choosing a subtorus of codimension one) and the complete normal surfaces with a non-trivial \mathbb{C}^* -action. Intersection cohomology for the surface and toric cases was studied around the 90's by Stanley, Denef and Loeser, Fieseler, Bernstein and Lunts, Fieseler and Kaup, Braden and MacPherson, ..., and many others. We suggest a natural generalization using the geometric and combinatorial approach of Altmann, Hausen, and Suess for normal varieties with a torus action in terms of the language of divisorial fans. Roughly speaking, this description encodes for a normal variety with a complexity-one torus action, the data of an equivariant proper birational map (*the contraction map*), where the target space is our initial variety, and the source space is a toric fibration over a smooth algebraic curve. Using recent results of de Cataldo, Migliorini, and Mustașă, and looking at the decomposition theorem for the contraction map, we will explain how inductively describe the intersection cohomology Betti numbers in terms of the associated divisorial fan.