Steven Amelotte

Equivariant formality of torus actions on moment-angle complexes

University of Western Ontario

Toric topology assigns to each finite simplicial complex K a space with a torus action, called the moment-angle complex, whose equivariant topology neatly reflects combinatorial properties of K and homological properties of the Stanley-Reisner ring of K. In this talk we describe certain higher cohomology operations induced by the torus action (in the sense of Goresky-Kottwitz-MacPherson) which obstruct equivariant formality in much the same way that Massey products obstruct (ordinary) formality. By interpreting these cohomology operations in terms of Hochster's formula and the minimal free resolution of the Stanley-Reisner ring, we obtain simple combinatorial and algebraic characterisations of equivariant formality for torus actions on moment-angle complexes.

Analogues of these results apply to actions of elementary abelian 2-groups on the real moment-angle complex associated to K. When K is flag, this leads to a characterisation of when group cohomology is free as a module over a polynomial ring for certain groups which interpolate between the right-angled Coxeter group associated to K and its derived subgroup.

This is joint work with Benjamin Briggs.