ON POLYHEDRAL PRODUCTS OF LOW LS-CATEGORY

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Toric Topology allows us to relate topological properties of spaces with a compact torus action (polyhedral products, quasitoric manifolds, small covers) to combinatorics of their orbit spaces – simple polytopes and simplicial complexes. In particular, a number of remarkable results have already been obtained linking calculation of homotopy type invariants of moment-angle-complexes $\mathcal{Z}_K$ to homological properties of the corresponding Stanley–Reisner rings $\mathbb{Z}[K] \cong H^*_{T^m}(\mathcal{Z}_K)$ (m equals the number of vertices of the simplicial complex K).

In this talk we will show how this interplay between topology and combinatorial commutative algebra works in the classical problem of determining necessary and sufficient conditions for a CW complex X to have a small Lusternik—Schnirelmann category (that is, $cat(X) \leq 3$).

The talk is based on a joint work with Djordje Baralić, Jelena Grbić, and Aleksandar Vučić.

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