Oklahoma State University

Topology Seminar

Title

A Convex "Un-Combination" Theorem with Applications

Speaker:Kim Ruane, Tufts UniversityDate:May 3, 2017Time:3:30 PMRoom:MSCS 423

Abstract: There are several instances of combination theorems in group theory - i.e. if A and B satisfy a property P, and a reasonably nice group C is embedded as a subgroup in each, then the amalgam $Astar_CB$ has property P. For instance, if A, B are finitely presented and C is finitely generated, then the amalgam is finitely presented. A more geometric type of combination theorem along these lines says that if A and B are CAT(0) groups and C is a convex subgroup of each, then the amalgam is again CAT(0). By an "un-combination" theorem, I mean the following: suppose $G = Astar_C B$ has a property P and C is a reasonably nice group, then both A and B also have property P.

In joint work with C. Hruska, we prove the un-combination theorem in the CAT(0) setting - i.e. if G is CAT(0) and splits as the fundamental group of a finite graph of groups with convex edge groups, then the vertex groups of the splitting are also CAT(0) groups. We use this as a tool for proving several results about CAT(0) groups with the Isolated Flats property. Our main theorem characterizes when a one-ended CAT(0) group with the Isolated Flats property has locally connected boundary - this characterization is determined by the types of splitting the group admits.

We will motivate this theorem and the proof techniques by carefully analyzing some key examples.