Geometry, Groups and Dynamics/GEAR Seminar
(held at the Illinois hub of GEAR)

Thursday, February 19, 2015, 1:00 pm in 243 Altgeld Hall

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The Tits alternative for the automorphism group of a free product

Abstract: A group G is said to satisfy the Tits alternative if every subgroup of G either contains a nonabelian free subgroup, or is virtually solvable. The talk will aim at presenting a version of this alternative for the automorphism group of a free product of groups. A classical theorem of Grushko states that every finitely generated group G splits as a free product of the form $G_1*...*G_k*F_N$, where F_N is a finitely generated free group, and all G_i are nontrivial, non isomorphic to Z, and freely indecomposable. In this situation, I prove that if all groups G_i and $Out(G_i)$ satisfy the Tits alternative, then so does the group $Out(G)$ of outer automorphisms of G. I will present applications to proving the Tits alternative for outer automorphism groups of right-angled Artin groups, or of some classes of relatively hyperbolic groups. I will then present a proof of this theorem, in parallel to a new proof of the Tits alternative for mapping class groups of compact surfaces. The proof relies on a study of the actions of some subgroups of $Out(G)$ on a version of the outer space for free products, and on a hyperbolic simplicial graph.

Video