Relative Bounded Cohomology on Groups with Contracting Elements

Speaker: Zhenguo Huangfu
ShanghaiTech University

Time: Fri, Nov 22th, 16:00 - 17:00
Venue: Room 102, SCMS
Abstract:

Let G be a countable group acting properly on a metric space with contracting elements and $\{H_i:1\le i\le n\}$ be a finite collection of Morse subgroups in G. We prove that each H_i has infinite index in G if and only if the relative second bounded cohomology $H^{2}_b(G, \{H_i\}_{i=1}^n; \mathbb{R})$ is infinite-dimensional. In addition, we also prove that for any contracting element g, there exists $k>0$ such that $H^{2}_b(G, \llangle g^k\rrangle; \mathbb{R})$ is infinite-dimensional. Our results generalize a theorem of Pagliantini-Rolli for finite-rank free groups and produce some new results on the (relative) second bounded cohomology of groups.

Under the same conditions, we also prove a Gap Theorem stating that any C-contracting element g in G either has a power which is conjugate to its inverse, or else the stable commutator length of g is at least equal to some constant $\tau=\tau(C)>0$. This generalizes the Gap Theorem obtained by Calegari-Fujiwara for hyperbolic groups and mapping class groups. Joint work with Renxing Wan.