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Research statement

A group G is called *acylindrically hyperbolic* if it admits a non-elementary acylindrical action on a hyperbolic space. In [4], I answered the following question : Which groups admit non-elementary cobounded acylindrical actions on quasi-trees? By a quasi-tree I mean a connected graph quasi-isometric to a tree, which form a subclass of hyperbolic spaces. Indeed, one could expect that the answer to the above would produce a proper subclass of the class of all acylindrically hyperbolic groups. My main result shows that this does not happen : *Every acylindrically hyperbolic group admits a non-elementary cobounded acylindrical action on a quasi-tree.*

Recently - with C.Abbot and D.Osin - the goal of my research has been to introduce the set of acylindrically hyperbolic structures on any group G, denoted $\mathcal{AH}(G)$. Elements of $\mathcal{AH}(G)$ are equivalence classes of cobounded acylindrical G-actions on hyperbolic spaces, ordered according to the amount of information they provide about G. My result from [4] proves that $\mathcal{AH}(G)$ contains an element corresponding to a quasi-tree for every acylindrically hyperbolic group G. We answer some questions about the poset structure of $\mathcal{AH}(G)$, rigidity phenomena similar to marked spectrum rigidity for hyperbolic manifolds, the natural action of $Out(G)$ on $\mathcal{AH}(G)$, and the existence of maximal structures (or acylindrically hyperbolic accessibility).

References

[1] C.Abbott, S.Balasubramanya, D.Osin; Acylindrically hyperbolic structures on groups, preprint, 2016.

[2] C.Abbott, D.Hume, D.Osin; Extending group actions on metric spaces, preprint, 2016.

[3] M.Aschenbrenner, S.Friedl, H.Wilton; 3-manifold groups, EMS Series of Lectures in Mathematics, European Mathematical Society (EMS), ZÃijrich, 2015.

[4] S.Balasubramanya, Acylindrical group actions on quasi-trees, arXiv:1602.03941.

[5] R.Charney, J.Crisp; Relative hyperbolicity and Artin groups; arXiv:math/0601179.

[6] F.Dahmani, V.Guirardel, D.Osin; Hyperbolically embedded subgroups and rotating families in groups acting on hyperbolic spaces, arXiv:1111.7048; *Memoir AMS*, to appear.

[7] B.Farb, D.Margalit; A Primer on Mapping class groups; Princeton University Press, Princeton Mathematical series 49.