

The homology of big mapping class groups

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Abstract.

Big mapping class groups – mapping class groups of infinite-type surfaces – have recently become the subject of intensive study, having connections for example with geometric group theory and dynamical systems. However, their homology in degrees above one has so far been very little understood.

I will describe two contrasting results, from joint work with Xiaolei Wu, that exhibit very different behaviours of the homology of big mapping class groups. First, we find an uncountable family of big mapping class groups (including the mapping class group of the disc minus a Cantor set) whose integral homology vanishes in all positive degrees. Second, we find another uncountable family of big mapping class groups (including the mapping class groups of the flute surface and of the Loch Ness monster surface) whose integral homology is uncountable in each positive degree.

We also study the pure subgroups of big mapping class groups, namely the subgroups consisting of mapping classes that fix each end of the surface. These have more uniform behaviour: we prove that, for every infinite-type surface, its pure mapping class group has uncountable homology in each positive degree.

Based on joint work with Xiaolei Wu; see [arxiv:2211.07470](https://arxiv.org/abs/2211.07470) and [arxiv:2212.11942](https://arxiv.org/abs/2212.11942).