

Asymptotic monopoles, infinite-type surfaces and exotic groups

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Abstract.

I will talk about three recent results of different flavours related by the existence of homological stability phenomena. The first is a partial calculation of the homology of moduli spaces of asymptotic magnetic monopoles; this is currently much less well-understood than the classical monopole moduli spaces, whose homology is completely known after work of Donaldson, Segal and Cohen-Cohen-Mann-Milgram. The second is a complete calculation of the homology of the mapping class group of the plane minus a Cantor set, as well as other infinite-type surfaces. Finally, an important kind of embedding statement in group theory is “*any group with property P embeds into an acyclic group with property P* ” (for example this is true for $P =$ countability and may be used to prove Atiyah’s L^2 -index theorem). The third result that I will discuss is that this embedding statement is true for $P =$ finiteness type F_n , extending results from the early 80s for $n = 1$ and $n = 2$. These results include joint work with Ulrike Tillmann and with Xiaolei Wu.