Seminário de Álgebra

Distinguishing 4-dimensional geometries via profinite completions

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Abstract.

It is well-known that there are 19 classes of geometries for 4-dimensional manifolds in the sense of Thurston. We could ask that to what extent the geometric information is revealed by the profinite completion of the fundamental group of a closed smooth geometric 4-manifold. We show that the geometry of a closed orientable 4-manifold in the sense of Thurston could be detected by the profinite completion of its fundamental group except when the geometry is $\mathbb{H}^4$, $\mathbb{H}^2_{\mathbb{C}}$ or $\mathbb{H}^2 \times \mathbb{H}^2$. Moreover, despite the fact that not every smooth 4-manifold could admit one geometry in the sense of Thurston, some 4-dimensional manifolds with Seifert fibred structures are indeed geometric. For a closed orientable Seifert fibred 4-manifold M, we show that whether M is geometric could be detected by the profinite completion of its fundamental group. This is a joint work with Zixi Wang.