
STEVE BOYER, Département de mathématiques, Université du Québec à Montréal, PO Box 8888, Centre-ville, Montreal, QC H3C 3P8

Involutions on 3-manifolds and exceptional Dehn filling

Let M be a compact, connected, orientable, hyperbolic 3-manifold with torus boundary. Thurston proved that all but finitely many Dehn fillings of M are hyperbolic manifolds. Over the last few decades much research has been devoted to understanding the set of Dehn fillings which are exceptional, that is, non-hyperbolic. By Perelman's work, these are the fillings which contain either an essential 2-sphere or an essential torus, or are small Seifert-fibred manifolds. The exceptional fillings which are least understood are those which yield small Seifert manifolds. In this talk we describe recent progress on determining the relationship between this family of fillings and those which contain essential tori. In particular we show that for generic M , this relationship satisfies the main conjectures in the subject. We also show that in the non-generic case, M admits an orientation preserving involution with quotient a simple manifold like a ball or solid torus. This allows us to convert the exceptional filling problem into a problem about links in the 3-sphere or a lens space, which can then be analysed using classical methods.

This talk reports on joint work with Cameron Gordon and Xingru Zhang.