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Affine deformations of the holonomy group of a three-holed sphere

Let T be a complete hyperbolic surface homeomorphic to a three-holed sphere and let G denote the image under the holonomy representation of its fundamental group. Identifying the group of hyperbolic isometries with an appropriate component of the group of isometries of Minkowski spacetime, we may consider affine deformations of G; we may ask, when does this affine deformation act properly discontinuously on R^3? An important invariant for affine isometries with non-elliptic linear part is the *Margulis invariant*, which is a measure of signed Lorentzian displacement. In this paper, we show that an affine deformation of G acts properly discontinuously if and only if the Margulis invariant is positive for each of the three isometries corresponding to the pant holes of T. More precisely, we show that such an affine deformation admits a fundamental domain.

This is joint work with Drumm and Goldman.