

Moves preserving hyperbolicity of link complements

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Given a link Γ in a 3-manifold P such that the complement $P \setminus \Gamma$ admits a complete hyperbolic metric of finite volume, we provide two potential alterations to the link, called the Chain Move and the Switch Move, that preserve hyperbolicity of the complement, with only a few manifold-link pair exceptions. These allow for a substantial increase in the number of known hyperbolic links in the 3-sphere and other 3-manifolds. Using such moves, we prove that any surface with admissible finite topology (i.e. negative Euler characteristic) can be realized as a properly embedded, totally geodesic surface in some complete hyperbolic 3-manifold of finite volume.