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Lower bounds for Resonances

This is joint work with Frederic Naud. For infinite area, geometrically finite hyperbolic surfaces we prove new lower bounds on the local density of resonances for points lying in a logarithmic neighborhood of the real axis. These lower bounds involve the dimension of the limit set of the fundamental group of the surface. The first bound is general and shows logarithmic growth of the number of resonances at high energy. The second bound holds if the fundamental group is an infinite index subgroup of certain arithmetic groups. In this case we obtain a polynomial lower bound. As time permits, we shall discuss generalizations to hyperbolic three-manifolds, as well as new results on the existence of infinitely many resonances in an effective strip depending on the Haudorff dimension of the limit set.