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Eigenfunctions of the Laplacian are basic building blocks of harmonic analysis on Riemannian manifolds. The sup-norm problem asks for bounds on the pointwise values of an L^2 -normalized eigenfunction in terms of its Laplacian eigenvalue or other increasing parameters. Exciting progress in arithmetic cases means that this question, which is particularly interesting from the point of view of quantum mechanics, now occupies a prominent position at the interface of automorphic forms, analytic number theory, and analysis.

In this talk, we will present our recent bounds solving the sup-norm problem for spherical Hecke–Maaß newforms of square-free level for the group $GL(2)$ over a number field, with a power saving over the local geometric bound simultaneously in the eigenvalue and the level aspect. Our bounds feature a Weyl-type exponent in the level aspect, they reproduce or improve upon all known special cases, and over totally real fields they are as strong as the best known hybrid result over the rationals.

The talk will emphasize several new features and difficulties that the number field setting (and specifically complex places) introduces and new techniques we developed to address them, which are also of independent interest. (Received September 19, 2017)