

Departmental Research Colloquim: Spectra and dynamics of hyperbolic surfaces

Wednesday, 7 December 2022 15:00 (1 hour)

A hyperbolic surface is a surface, in the intuitive sense, with a geometry that is negatively curved at every point with the same curvature (-1) everywhere. These are not easy to visualize, but there are many of them.

Two interesting things to study on a hyperbolic surface are the dynamics of the geodesic flow (classical mechanics) and the Laplacian differential operator (quantum mechanics). The geodesic flow is chaotic and so the Laplacian there belongs to a field of study known as quantum chaos. Although these systems are far from being solvable in any sense, they are often the first place that we can see anticipated physical phenomenon rigorously. This is because for a hyperbolic surface, there is further structure (representation theory) that bridges the classical and quantum mechanics.

I will explain all this in simple terms, covering a range of paradigms that hyperbolic surfaces provide us to study.

If I have time, I'll then highlight some recent results in the field.

Presenter: MAGEE, Michael (Durham University)