Prof. Dr. Daniel Grieser
The spectrum of triangles

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Vortrag im Rahmen des Forschungsseminars "Geometrische Analysis und Spektraltheorie"

I will report on two recent results about the spectrum of the Dirichlet Laplacian on a Euclidean triangle. First, I will give a new proof that the spectrum deter-mines the triangle. Using the well-known heat kernel asymptotics, the problem is reduced to a seemingly rather classical, albeit non-trivial uniqueness theorem about triangles whose truth had been observed numerically by several people working in the area but whose rigorous proof had been outstanding. On the PDE side, the heat kernel is much simpler tool than the wave kernel, which was used in the proof of spectral determinacy of triangles by Durso in 1990. In the second part of the talk I will discuss the asymptotic behavior of individual eigenvalues as functions of the triangle, when the triangle degenerates to a line (joint work with R. Melrose). Up to scaling, this degeneration depends on two parameters, and I will give the complete asymptotic behavior as either one or both of these parameters tend to the degeneration limit. There are some sur-prises in this behavior, in particular it involves a rather non-obvious blow-up of the 'moduli' space of triangles.

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