

## **Prof. Dr. Peter Doyle (Dartmouth College)** Hearing the shape of a drumset

## TIME:

10 May 2006, 17:30

## **LOCATION:**

HU Berlin, Institut für Mathematik Rudower Chaussee 25, Raum 1.013

Disconnected spaces having the same spectrum are more interesting than you probably think.

For example, among rectangular flat tori, two 1-by-1s and a 2-by-2 sound like two 2-by-1s and a -by-. This example comes from the Hecke operator T2 applied to a square torus.

The same trick works when any Hecke operator is applied to any torus. It is easy to speculate (and may well already be known) that these Hecke relations span all possible spectral coincidences among unions of tori.

Here's an orbifold variation of the same trick. Let S be a square torus; S2 its 2-fold quotient 2222-orbifold, and S4 its 4-fold quotient 244-orbifold (using Conway's orbifold notation). Then spectrally, S + 2 S4 = 3 S2. Note that this shows that you can't hear the number or type of cone-points on a disconnected 2-orbifold.

Other interesting examples abound - at least in the flat case.