abstract

MEMBERS SEMINAR
Topic:

Speaker:

Affiliation:

Date:

Time/Room:

If a closed subset X of the plane is projected orthogonally onto a line, then the Hausdorff dimension of the image is no larger than the dimension of X (since the projection is Lipschitz), and also no larger than 1 (since it is a subset of a line). A classical theorem of Marstrand says that for any such X, the projection onto almost every line has the maximal possible dimension given these constraints, i.e. is equal to min(1,dim(X)). In general, there can be uncountably many exceptional directions.

An old conjecture of Furstenberg is that if A, B are subsets of [0,1] invariant respectively under x2 and x3 mod 1, then for their product, X=A x B, the only exceptional directions in Marstrand's theorem are the two trivial ones, namely the projections onto the x and y axes. Recently, Y. Peres and P. Shmerkin proved that this is true for certain self-similar fractals, such as regular Cantor sets. I will discuss the proof of the general case, which relies on a method for computing dimension using local entropy estimates. I will also describe some other applications. This is joint work with Pablo Shmerkin.

The talk will be suitable for a general audience.