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Yuval Peres*, Microsoft Research, 1 Microsoft Way, Redmond, WA 98052. *Laplacian growth and the mystery of the abelian sandpile: A visual tour.*

We compare several growth models on the two dimensional lattice. In several models, like internal DLA, rotor-router aggregation and competitive erosion, the scaling limits are universal; in particular, starting from a point source yields a disk.

In the abelian sandpile, particles are added at the origin and whenever a site has four particles or more, the top four particles topple, with one going to each neighbor. Despite similarities to other models, for the sandpile, the intriguing pattern that arises is not circular and depends on the particular lattice- this contrasts with related growth models, like internal diffusion limited aggregation. It is an open problem to prove a scaling limit exists for the sandpile, though some bounds are known. This research has been greatly influenced by pictures of the relevant sets, which I will show in the talk. They suggest a connection to conformal mapping, which has not been established yet.

This talk is based on joint works with Lionel Levine, Anne Fey and Jim Propp. (Received June 10, 2010)