Nonlinear and nonlocal diffusion of dislocation densities

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A nonlinear pseudodifferential equation describing the dynamics of dislocations in crystals will be presented. This evolution equation contains a Lévy type operator and nonlinearity typical for the porous medium equation. We work in the setting of viscosity solutions, and we show that the long time asymptotics of solutions is described by explicit compactly supported self-similar profiles.

Joint work with P. Biler, C. Imbert, R. Monneau.