Dipartimento di Matematica - Università di Pisa

New trends in Partial Differential Equations and Applications

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Dislocation dynamics in crystals

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We consider an evolution equation arising in the Peierls–Nabarro model for crystal dislocation. We study the evolution of the dislocation function using analytic techniques of fractional Laplace type.

We show that, at a macroscopic scale, the dislocations have the tendency to concentrate at single points of the crystal, where the size of the slip coincides with the natural periodicity of the medium. These dislocation points evolve according to the external stress and an interior repulsive potential.

The results that will be presented have been obtained in collaboration with S. Dipierro, A. Figalli, G. Palatucci and extend previous works of R. Monneau and M. d. M. Gonzalez.

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