THE EVOLUTION OF ATOMIC DISLOCATIONS IN CRYSTALS

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We consider an evolution equation motivated by the Peierls-Nabarro model and we discuss its mesoscopic and macroscopic limits. The model deals with atomic dislocations in crystals and we discuss how the dislocation function has 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 potential, which can be either repulsive or attractive, depending on the relative orientations of the dislocations. For opposite orientations, collisions occur, after which the system relaxes exponentially fast.

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