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Stefania Patrizi* (spatrizi@math.utexas.edu), TX. *From the Peierls-Nabarro model to the equation of motion of the dislocation continuum.*

We consider a semi-linear integro-differential equation in dimension one associated to the half Laplacian whose solution represents the atom dislocation in a crystal. The equation comprises the evolutive version of the classical Peierls-Nabarro model. We show that for a large number of dislocations, the solution, properly rescaled, converges to the solution of a well-known equation called in the physics literature “the equation of motion of the dislocation continuum”. The limit equation is a model for the macroscopic crystal plasticity with density of dislocations. In particular, we recover the so called Orowan’s law which states that dislocations move at a velocity proportional to the effective stress. This is a joint paper with Tharathep Sangsawang. (Received September 14, 2020)