The Phase Field Method: microstructures evolutions in alloys and dislocations dynamics.

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The Phase Field Method has been extensively used to study the dynamical evolution of microstructures inherited from phase transformations. It has recently been extended to the dynamics of dislocations and thus to the domain of plastic deformation. We will present recent results in these two different fields. First, we analyse the competitive growth of different ordered precipitates in aluminium-based alloys (Al-Zr), and, second, we present a general formalism for the dislocations dynamics, that we illustrate of a first approach of alloy hardening.