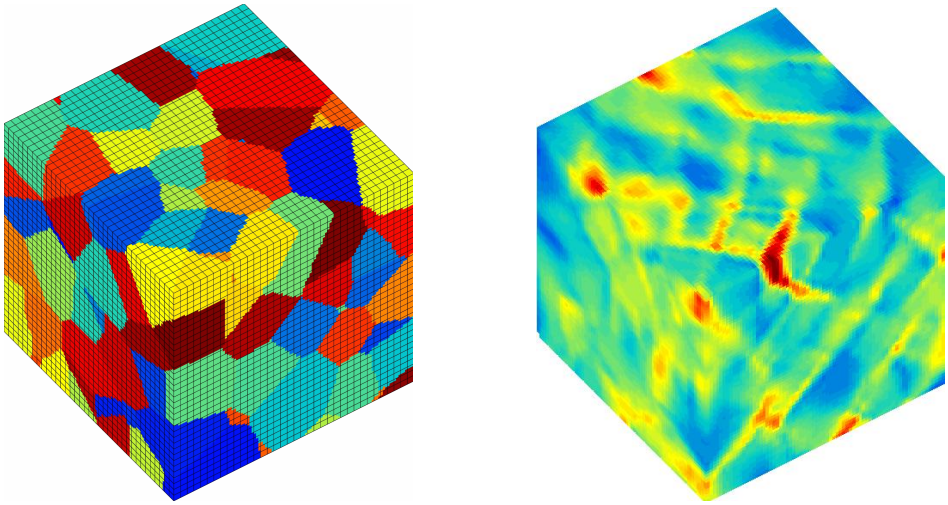
# Post–Doc Position

## Large scale finite element simulations of the size–dependent plasticity of polycrystalline aggregates

Large scale finite element computations make it now possible to consider Representative Volume Elements of metal polycrystals made of a collection of grains interacting elastically and plastically. Continuum crystal plasticity is an efficient and reliable tool to evaluate the plastic slip activity and the stress strain fields, at least when the grain size does not become lower than 1 to 10 $\mu$m. The objective of the work is to compute the deformation of grains under tensile, torsion and drawing loading conditions at large strain levels, and to describe the heterogeneity of strain and lattice rotation inside the grains. The largest computations will be performed on the parallel machine of the institute (160 processors). Two kinds of situations will be investigated : classical size–independent continuum crystal plasticity theory and generalized size–dependent crystal plasticity based on nonlocal theories. In particular, lattice curvature fields inside the grains will be studied as a function of grain size.

A close cooperation with Fraunhofer IWM–Freiburg and other institutes within the Marie-Curie Research Training Network (RTN) *"SizeDepEn - Engineering mechanics based on size-dependent materials properties"* is wanted (www.sizedepen.net).

We are looking for a post–doc researcher with an outstanding PhD in engineering mechanics or materials science and strong experience in numerical simulations. The candidate must be national of EU or associate states, cannot be French and should not have resided in France for more than 12 months in the last 3 years. Financial support is provided for 18 months. The work will take place at Centre des Matériaux (Evry, France, close to Paris) with possible exchanges with other nodes of the Marie Curie network.



*Finite element computation of a polycrystalline aggregate : finite element mesh and plastic slip map during tension*

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