Post doctoral Position CHAIR “MSE” 2017-2018

ALTAIR ENGINEERING

Behaviour laws for 3D printing

During the Additive Manufacturing process a laser beam melts a metallic powder layer which then solidifies.

The first problem is the prediction of residual stresses in the printed part and in their support; this is done with thermo-mechanical macro models. To perform such an analysis one needs a material law which takes into account phase transitions, solid to liquid to solid, as well as the changes in metallurgical properties. The material law should cover various types of materials, such as aluminum, titanium and steel. Various laws exist in the literature and it is necessary to make the best choice adapted to each material.

The second problem is to define the best strategy to simulate the full process. To solve this problem one may need to work at a finer scale (so called mesoscale) and to define the way to work efficiently on the industrial part. Experimental data will also be needed for validation.