



Unione Europea



Università degli Studi di Salerno



DIPARTIMENTO DI INGEGNERIA CIVILE

Dottorato di Ricerca in *Ingegneria delle Strutture e del Recupero Edilizio e Urbano*

Il giorno **31 ottobre 2016** dalle ore **9:30 alle 10:30** presso l'**Aula Multimediale** del Laboratorio di Strutture, il

Prof. Marc Durand

Laboratoire MSC, UMR 7057 Université Paris Diderot & CNRS, Paris, France

<http://www.marcdurand.net/>

terrà il seguente seminario:

Topological and Geometrical Disorders in Foams

Foams and cellular materials are interesting both as out-of-equilibrium systems with well-defined metastable states, and as models for more complex systems such as biological tissues. In the low liquid fraction ("dry" foams), foam structure is disordered but not disorganized: in two-dimensional foams, films are circular arcs that meet at three-fold junctions with 120° angles. One can define a topological disorder, associated with the distribution of number-of-sides per bubble, and a geometrical disorder, associated with the distribution of bubble size. There are evidence that these two disorders are correlated: in a monodisperse foam (1 bubble size), most of the bubbles are 6-sided. In a polydisperse foam, the larger bubbles have statistically more sides than the smaller ones. Bubble size distribution and packing (or "topology") are crucial in determining e.g. rheological properties or coarsening rate. When a foam is shuffled (either mechanically or thermally), bubbles undergo "T1" neighbour changes, which induce a random exploration of the foam configurations. We explore the relations between the geometrical and topological properties of a shuffled foam by using Monte-Carlo simulations. The observations are compared with a statistical model which takes into account the physical ingredients specific to foams [1,2]. In particular, we investigate the possible existence of an order-disorder transition driven by the size dispersity.

[1] M. Durand et al., Physical Review Letters, 107, 168304 (2011).

[2] M. Durand, European Physical Journal E 38(12), 137 (2015).

Il Coordinatore del Dottorato
Prof. Ing. **Ciro Faella**