



ESPCI  
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## Séminaire PMMH

*Bureau d'Études, Bâtiment L, 2<sup>ème</sup> étage*

*Vendredi 6 février 2015, 11h00-12h00*

### Jordi Ortin (Univerisitat de Barcelona)

Univerisitat de Barcelona

#### **Scale invariance, non-Gaussian fluctuations and intermittency in fluid imbibition**

I will review the work on viscous fluid invasion of a model open fracture carried out in Barcelona these last years, in the context of interfacial dynamics in disordered media. The model consists on a Hele-Shaw cell with carefully-controlled, randomly-distributed dichotomic variations of the gap thickness. Distortions of the advancing front produced by capillary pressure fluctuations are damped by interfacial tension and fluid viscosity. Using fast and high-resolution imaging we have been able to track the evolution of the advancing front in space and time with high accuracy. Our measurements have shown that an initially flat front undergoes a kinetic roughening process that leads to a statistically-stationary state in which the morphology of the invading front is scale invariant. The motion of the front takes place by localized bursts whose lateral sizes, areas and durations are found to be power-law distributed, up to a cutoff scale that is controlled by the capillary number of the displacement. A scale-dependent statistical analysis has also shown that the mean velocity of the front, in windows smaller than the lateral correlation length, exhibits non-Gaussian fluctuations and intermittency.