LadHyX Seminar – October 16th, 10:45

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Intermittent clogging, flow kinematic and mixing in 3D porous media

Refractive index matching techniques allows for innovative approaches to investigate complex diphasic system, where there is both a fluid and a solid phase. This will be illustrated by showing and discussing not only how these experimental techniques allow to directly visualise the flow within the bulk of 3D porous media, but also lead to the characterization of both the mixing and the dispersion processes. We observe that the tortuosity of the streamlines promote an efficient stretching of a blob of dye when injected throughout a porous media, leading to a rapid mixing by homogeneising the dye concentration level. Furthermore, the experimental measurement of high resolution 3D velocity field within the bulk of the media can also be used to adress the question of how the pore microstructure controls the velocity distribution.

I will also discuss about clogging, when a suspension of particles flow through a constriction, a reminiscent phenomenon within geomaterials, which also exhibits a rich phenomenology with various flow regimes including intermittent clogging when a constriction is temporarily clogged thus interrupting the flow of particles. I will in particular focus on the role of the driving force on the clogging/unclogging process.