Contribution ID: **850**   Type: **Poster**

Diffusive processes across frictional patterns

Wednesday, 16 May 2018 17:30 (15 minutes)

The progress of the interface between an invasive fluid and a defending mixture of granular material together with a second fluid, immiscible with the invading phase, has recently been used to form complex patterns in both Hele-Shaw cells or millifluidic confinements. These are the result of the deformation of a confined porous material, made of an homogeneous granular phase, into an heterogeneous structure exhibiting various sizes and permeabilities at different scales. A labyrinthine pattern can then be obtained after the withdraw of a liquid phase containing glass beads and confined in an horizontal Hele-Shaw cell, see *Knudsen et al.*, PRE **77**, 021301 (2008). What are then the transport properties within such a geometrical structure? The geometrical constraints with dead-ends are limiting the transport of diffusing species from a central entry point towards the edges of the labyrinth. A transient subdiffusive transport can be obtained over a time scale determined by the wavelength of the pattern.

References

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Primary authors: Mr OSLEN, Kristian (University of Oslo, Porous Media Laboratory); Dr DUMAZER, Guillaume (University of Oslo, Porous Media Laboratory); Prof. FLEKKØY, Eirik (University of Oslo, Porous Media Laboratory)

Presenter: Dr DUMAZER, Guillaume (University of Oslo, Porous Media Laboratory)

Session Classification: Poster 3

Track Classification: MS 3.10: From deformable porous media to frictional fluids