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Yield stress fluid flow in model porous media JOHAN PAIOLA, Univ de Paris, HUGUES BODIGUEL, Laboratory of the Future (LoF), University of Bordeaux, 178, avenue du Dr Schweitzer F-33608 Pessac, France, HAROLD AURADOU, Fluide Automatique et Systèmes Thermiques (FAST), Paris Sud University, 91405 Orsay Cedex, France — Yield stress fluids display interesting flow behavior due to their non-linear flow curve and some applications involve this flow in porous medial. Predicting the flow behavior is thus of great interest but is further complicated by the complexity of the geometry and the interplay between the heterogeneities of the medium and the existence of a yield stress. Models developed in order to describe Darcy's law assume a rheological law applied. Alternatively, micromechanical models predicts that the flow concentrates at low flow rates in preferential paths, which strongly depends on the details of the porous geometry. At this stage, rather few experiments are available at the scale of a few pores, and we propose in this work to study the flow of yield stress fluids in micromodels of porous media to address experimentally the existence and characteristic of these preferential paths. We use Carbopol as a model yield stress fluid. This fluid is injected into various model porous media. The main objective of our experiments is to map the fluid velocity field as a function of the global pressure drop applied. We develop a new experimental method where we can obtain simultaneously to measure local velocities at the scale of one channel (200 um) but on the entire porous geometry (5cm x 5cm).

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