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Flow of concentrated emulsion in a microchannel: walls effects and roughness impact VINCENT MANSARD, ANNIE COLIN, LOF, Universite de Bordeaux, LYDÉRIC BOCQUET, LPMCN, UniversiteLyon 1 — Soft glassy materials have ubiquitous rheological properties. At small stress they deform elastically. For stress above a threshold they flow like liquids. At microscale, they are composed of highly disordered particles caged by the neighborhood. Flow happens by successive cage-jumps -or rearrangement. We study concentrated emulsion as a model fluid. When it flows in confined geometry, the viscosity does not correspond to the rheometer measurements but obeys to a non-local relation (Goyon-2008) due to rearrangement's correlation. As they impose viscosity's boundary conditions, walls modify the flow. We study carefully the conditions imposed by the walls and the impact of the roughness. In a microchannel, we create a Poiseuille flow. Using a fast confocal microscope we visualize the droplets and measure the velocity with high spatial resolution. At high stress, we observe one or two discontinuities of the velocity at respectively one and two droplets' diameters. They are due to stratification of the first droplets' layers. Far from them the non-local model remains valid. We create roughness by adding controlled size patterns. The roughness modifies the apparition of the stratifications and the limit conditions on the viscosity. We will compare these results with theory.

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