Droplet motion in porous media or microfluidic channels with constrictions

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The study of the droplet motion through a three-dimensional constriction in a circular or rectangular channel is a problem encountered in a broad range of applications including the enhance oil recovery and microfluidic devices.

Utilizing our three-dimensional spectral boundary element algorithm, we study the motion, deformation and critical blocking conditions of a viscous droplet in a channel at low-Reynolds-number flows.

We investigate the effects of several parameters affecting the drop dynamics as it is squeezed through the constriction including droplet size, size of constriction and asymmetrical constriction shapes.