Slippage of simple liquids past super-hydrophobic surfaces

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Reducing the friction of liquid flows at solid boundaries has become an important issue in the context of the development of microfluidic systems. The use of gas as a lubricant – such as microbubbles trapped in super-hydrophobic surfaces – is commonly suggested as a possible way to achieve high slippage of liquids at walls. This presentation will focus on the characterization of slippage of simple-liquid flows over super-hydrophobic surfaces with a short review on theoretical and experimental studies (including μ-PIV - Particule Image Velocimetry - and nanorheology measurements). Scaling laws quantifying the super-lubricating potential of super-hydrophobic nano/micro patterned surfaces will be presented and compared with numerical and experimental studies. The influence of the pattern geometry (such as periodicity, fractal surfaces) and of the curvature of the liquid-gas menisci on the hydrodynamic boundary condition will be emphasized regarding the actual capacity of liquid-gas interfaces at super-hydrophobic surfaces to reduce slippage.