Bending Plateau's laws Equilibrium shape of an elastic ribbon in a 2D bubble column

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> bubbles + elastic ribbon - - - - - - - - - - - - - - - bubbles only

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bubbles only

with elastic ribbon capillarity + elasticity



geometry dictated by capillarity (Plateau's laws)

INCREASING BENDING RIGIDITY

An elastic ribbon (PDMS) is introduced inside a staircase structure of bubbles in a square column. Depending on the thickness of the ribbon (and thus its bending rigidity), the shape of the ribbon goes from a geometry dictated by the bubbles to a shape dominated by the rigidity of the ribbon. We quantify both experimentally (via X-ray tomography) and theoretically (via energy minimization under constraints) the deflexion and the profile of the ribbon, and demonstrate as a proof of concept that this setup can be used to grant a shape to a UV curable composite ribbon.

More details in Jouanlanne et al, *Soft Matter* 2022 https://doi.org/10.1039/D1SM01687C