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Flèches capillaires auto-assemblées

(Contribution invitée)

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Anisotropic particles adsorbed at a water-air interface are known to aggregate due to capillary interactions. We show that the packing configuration of a pair of prolate ellipsoids critically depends on their relative size and/or aspect ratio mismatch. While identical particles simply pack side-by-side, particles of slightly different sizes are observed to systematically self-assemble into characteristic *arrows*, i.e. with a finite angle between their axes.

The occurrence of such arrows cannot be explained within the far-field approximation of interacting polar quadrupoles. A numerical analysis is worked out, which allows us to explore the near-field characteristics of the capillary interaction. Results clearly show the destabilization of the side-by-side configuration due to a size mismatch, in agreement with experimental observations. Such arrows are actually seen in our macroscopic world and our results highlight the importance of geometrical factors to explain the morphology of aggregated structures at fluid interfaces.