"Self-assembled Capillary Arrows"

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Abstract. 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.