Abstract Submitted
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Elastocapilllarity in insect adhesion: the case of beetle adhesive hair[1] SOPHIE GERNAY, TRISTAN GILET, University of Liege, PIERRE LAMBERT, Universite Libre de Bruxelles, WALTER FEDERLE, University of Cambridge — The feet of many insects are covered with dense arrays of hair-like structures called setae. Liquid capillary bridges at the tip of these micrometric structures are responsible for the controlled adhesion of the insect on a large variety of substrates. The resulting adhesion force can exceed several times the body weight of the insect. The high aspect-ratio of setae suggests that flexibility is a key ingredient in this capillary-based adhesion mechanism. There is indeed a strong coupling between their elastic deformation and the shape of the liquid meniscus. In this experimental work, we observe and quantify the local deflection of dock beetle seta tips under perpendicular loading using interference microscopy. Our results are then interpreted in the light of an analytic model of elastocapillarity.

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