Abstract Submitted
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Fracture of Thin Anisotropic Sheets: selection of the fracture path JOSE BICO, PMMH-ESPCI, ATSUSHI TAKEI, University of Tokyo, BENOIT ROMAN, PMMH-ESPCI, EUGENIO HAMM, FRANCISCO MELO, Universidad de Santiago de Chile — It is often postulated that quasistatic cracks propagate along the direction allowing fracture for the lowest load. Nevertheless, this statement is debated, in particular for anisotropic materials. We performed tearing experiments in anisotropic brittle thin sheets that validate this principle in the case of weak anisotropy. We also predict the existence of forbidden directions and facets in strongly anisotropic materials, through an analogy with the description of equilibrium shapes in crystals. However, we observe cracks that do not necessarily follow the easiest direction but can select a harder direction, which is only locally more advantageous than neighboring paths. These results challenge the traditional description of fracture propagation, and we suggest a modified, less restrictive criterion compatible with our experimental observations.

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