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Probing the sliding interactions between bundled actin filaments
ANDY WARD, ZVONIMIR DOGIC, Brandeis Univeristy — Assemblies of filamentous biopolymers are hierarchical materials in which the properties of the overall assemblage are determined by structure and interactions between constituent particles at all hierarchical levels. For example, the overall bending rigidity of a two bundled filaments greatly depends on the bending rigidity of, and the adhesion strength between individual filaments. However, another property of importance is the ability for the filaments to slide freely against one another. Everyday experience indicates that it is much easier to bend a stack of papers in which individual sheets freely slide past each other than the same stack of papers in which all the sheets are irreversibly glued together. Similarly, in filamentous structures the ability for local re-arrangement is of the utmost importance in determining the properties of the structures observed. We have developed a method to directly measure the frictional interactions between a pair of aligned filaments in a well-defined and controllable configuration. This enables us to systematically investigate the role of adhesion strength, filament orientation, length, and surface structure.

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