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Crosslink dynamics in a model of two filaments of actin under shear ARJAN BOERMA, ERIK VAN DER GIESSEN, STEFANOS PAPANIKOLAOU, University of Groningen — We seek to elucidate the dynamic mechanisms underlying the stress dependent effects of the cellular cytoskeleton, as they are observed in the storage and loss modulus as a function of frequency and cross-linker concentration. We report on the statistical behavior of the effects originating from cross-linker dynamics in the basic constituent of a cytoskeleton network: two mutually cross-linked filaments. We model each of the filaments and the cross-linkers in terms of elastic finite elements. Unbinding of individual cross-linkers takes place through a realistic constitutive model and re-binding may occur to maintain the average cross-linker density. Our approach provides a direct analysis of the athermal interplay of the elastic filament interactions with the dynamics of the cross-linking molecules.

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