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The mechanics of anisotropic cytoskeletal networks TAO ZHANG, MOUMITA DAS, Syracuse University, D.A. QUINT, UC-Merced, J.M. SCHWARZ, Syracuse University — At the leading edge of a crawling cell, the actin cytoskeleton extends itself via a branched, crosslinked network of filaments, otherwise known as the lamellipodium. The filaments in this network have an average preferred orientation of around $\pm$ 30 degrees with respect to the normal of the leading edge. This preferred orientation of filaments leads to a material that is structurally anisotropic. To better understand the forces generated by the lamellipodium, we analytically and numerically study the mechanical properties of a model branched and crosslinked filamentous network where the filaments are preferentially oriented along one direction. We investigate the interplay between geometry, elasticity and anisotropy in the network. In particular, we show how anisotropy modulates the onset of rigidity and non-linear mechanical response of the network.

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