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Supplemental Information

Nonlinear Actin Deformations Lead to Network Stiffening, Yielding, and Nonuniform Stress Propagation

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SUPPORTING MATERIALS

S1. ANGULAR DEPENDENCE OF ENSEMBLE-AVERAGED FILAMENT DISPLACEMENTS

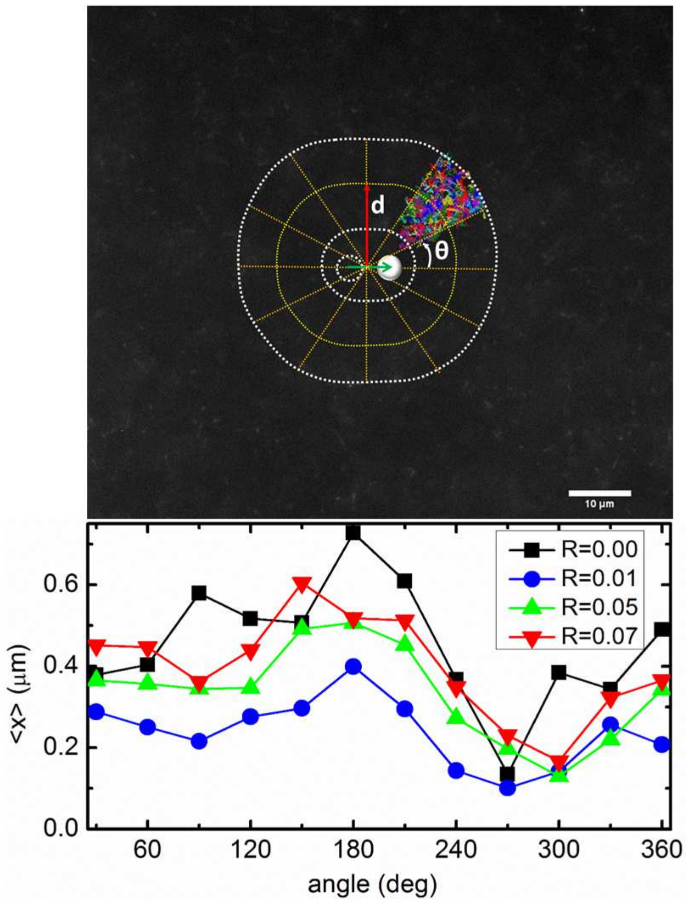

FIG. 1. (Top) Schematic illustration of angular sectioning method. Image is divided into $\theta = 30^\circ$ sections, bound by two concentric arcs of width 19 μm at a radial distance (red arrow) of $d = 14$ μm from the center of strain path (green arrow). Filament displacements in each section are averaged to determine the angular dependence of $< x >$. (Bottom) Ensemble-averaged displacement, $< x >$, versus angle for actin networks of varying crosslinker ratios R. Filament displacements vary by a factor of ~ 2 as a function of angle with the maximum displacements at the trailing edge of the strain and the minimum displacement perpendicular to the strain path. However, there is little dependence on the degree of crosslinking (R).

S2. SPATIAL DEPENDENCE OF FILAMENT DISPLACEMENTS

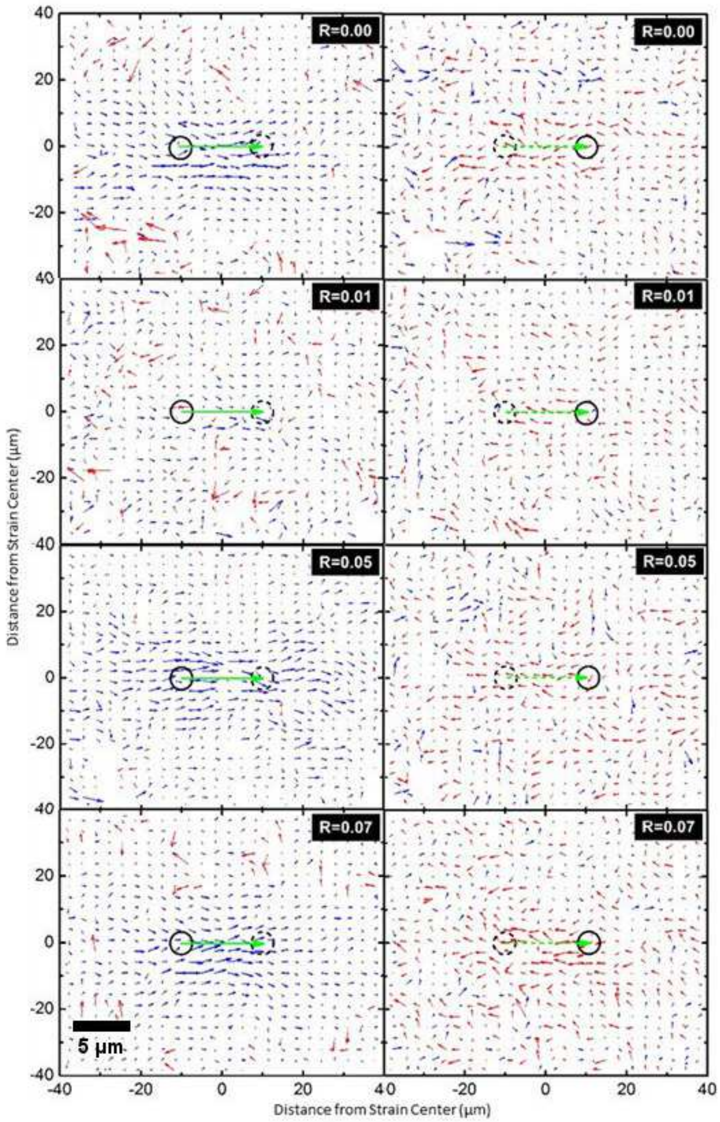

FIG. 2. Filament displacement maps for actin networks of varying crosslinker ratios R as indicated at the top right corner of each map. Vector maps show spatially-resolved filament displacements during strain (left column) and relaxation (right column). Arrows represent maximum filament displacements $(\vec{x}_{max} + \vec{y}_{max})$ averaged over $(3.4\mu m)^2$ regions, color coded by $\vec{y}_{max}$ direction, with blue and red arrows corresponding to positive and negative $\vec{y}_{max}$, respectively. The arrow lengths are scaled up by a factor of 2 from the scale of the axes (indicated by scale bar in bottom left map).