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Hydrodynamics of Active Permeating Gels ANDREW CALLAN-JONES, University of Montpellier II, FRANK JÜLICHER, Max Planck Institute for the Physics of Complex Systems — We present a hydrodynamic theory of active viscoelastic gels in which a polymer network is embedded in a background fluid. This work is motivated by active processes in the cell cytoskeleton in which motor molecules generate elastic stresses in the network which can drive permeation flows of the cytosol. Our approach differs from earlier ones by considering the elastic strain in the polymer network as a slowly relaxing dynamical variable. We discuss a specific case that illustrates the role of permeation in active gels: the self-propulsion of a thin slab of gel relative to a substrate driven by filament polymerization and depolymerization.

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