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Capillary wave dynamics on viscoelastic polymer thin-films: Monolayers and bilayers MARK HENLE, ALEX LEVINE, Department of Chemistry and Biochemistry, University of California, Los Angeles — We investigate the capillary wave dynamics of supported polymeric thin-films both at the free surface and at the buried polymer/polymer interface in a bilayer system. Recent XPCS experiments (J. Lal, *private communication*) on such systems suggest that the decay rate of the coupled capillary waves at the free surface and at the buried interface are remarkably independent of the in-plane wavevector. In order to understand this phenomenon, we present the results of continuum hydrodynamic calculations of the capillary wave dynamics on supported monolayers and bilayers of both Newtonian and viscoelastic fluids. We find that the experimentally observed wavevector dependence of the capillary-wave decay rate can be accounted for by treating one or both of the polymers as a viscoelastic fluid with a single stress-relaxation time. We also investigate the effect of a finite slip length at either the polymer/polymer interface or the polymer/substrate interface.

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