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Experimental investigation Faraday wave onset in viscoelastic materials[1] XINGCHEN SHAO, J. R. SAYLOR, JOSHUA BOSTWICK, Clemson University, PASQUALE CIARLETTA, Politecnico di Milano — Herein we explored the onset of parametrically excited surface waves (Faraday waves) on glycerin-water mixtures and agarose gels, ascertaining the effect of viscosity and elasticity on the threshold amplitude and mode selection. Faraday waves were mechanically generated in a circular tank mounted on an electromechanical shaker over a range of driving frequencies. We obtained multiple Faraday instability modes, each of which is characterized by a radial and azimuthal wave number and by a unique stability tongue in the amplitude-frequency space. Glycerin/water mixtures were used to explore a range of viscosities showing that for a given mode the frequency at onset decreases with viscosity, while the amplitude increases. In contrast, for gels, the onset frequency and amplitude both increase with elasticity. Experiments are then compared against theory. This work could potentially be used to develop a diagnostic method for measuring the complex modulus of viscoelastic materials.

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Xingchen Shao
Clemson University

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