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**Interfacial instabilities and Kapitsa pendula** MADISON KRIEGER, Brown University — Determining the critera for onset and amplitude growth of instabilities is one of the central problems of fluid mechanics. We develop a parallel between the Kapitsa effect, in which a pendulum subject to high-frequency low-amplitude vibrations becomes stable in the inverted position, and interfaces separating fluids of different density. It has long been known that such interfaces can be stabilized by vibrations, even when the denser fluid is on top. We demonstrate that the stability diagram for these fluid interfaces is identical to the stability diagram for an appopriate Kapitsa pendulum. We expand the robust, "dictionary"-type relationship between Kapitsa pendula and interfacial instabilities by considering the classical Rayleigh-Taylor, Kelvin-Helmholtz and Plateau instabilities, as well as less-canonical examples ranging in scale from the micron to the width of a galaxy.

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