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Hydrodynamic Analog for Radioactivity JUSTIN EDWARDS, JUSTIN CHAMBERLAIN, ORRIN MANNING, YASIR IQBAL, LUIS GRAVE DE PERALTA, Department of Physics and Astronomy, Texas Tech University — It has been shown that a drop of fluid can be made to bounce on a vertically oscillating bath of fluid. These droplets, known as "walkers", couple to the waves they generate. When a variation of depth in the fluid is introduced it creates a difference in potential; droplets crossing the barrier must do so on a transmitted exponentially decaying wave. We have created a system which spontaneously generates walker droplets to simulate particles leaving a potential well. In this system we use a forcing amplitude well above the Faraday instabilitythreshold to generate walker droplets autonomously. The droplets tunnel across a potential barrier to a damped region where the fluid is below the instability threshold. The formation of these droplets and their resulting kinetic energy is related to the amplitude and frequency of the driving oscillation. We studied the corral barrier's geometry and the driving frequency to understand the energy and formation of the droplets. The system could provide an analog to radioactivity in which particles spontaneously tunnel across a potential barrier, showing promise for future analysis.

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