

## The Quantum Casimir Effect: Why Current Evidence is Against It

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2023-08-29.22:27 EDT Tue

<https://youtu.be/szI-HpOScFQ&lc=UgzI4GqplGcKmJP0TjV4AaABAq>

A Comment on the [SciShow](#) (YouTube) post:  
*The Weight of "Nothing" Could Mean Everything (to Physics)* (Aug 29, 2023)  
<https://youtu.be/szI-HpOScFQ>

What a wonderful video! Any boater who's noticed how their small boat draws oddly close to nearby vertical walls when the water is choppy has felt a version of the Casimir effect. The choppy area has more energy — more little waves whacking one side of the boat — than the narrow, quiet, secluded pool between the boat and the wall. That push towards the wall is the Casimir effect, just with real waves and real energy harvesting — the waves lose a bit of intensity — replacing the virtual-only quantum waves.

Notably, on days when the water is quiet, the push disappears.

Dip a closed Venetian blind into the choppy water, close to the wall and parallel to it, and you can feel the push yourself. Open the slats of the blind, however, and the gentle push disappears. The waves pass through and make the water equally choppy on both sides, eclipsing the push.

That is the Archimedes Experiment.

This is a wonderful and deeply worthwhile experiment. However, its odds of success declined sharply in 2020 when careful studies of extreme cosmic gamma rays [\[1\]](#) showed detectable vacuum energy waves to be at least 1800 times smaller than the nominal hard "Planck scale" postulated by the amazing John Archibald Wheeler.

Even without the results of the Archimedes Experiment, the evidence thus already leans powerfully towards a level of spacetime smoothness vastly beyond the chunky, clunky, aether-like graininess of Wheeler's quantum foam and its string-theory and loop-gravity offshoots.

The irony is that Einstein, not Wheeler, is the one who most seems to have gotten it right: There is *no* texture to empty space, regardless of the energies involved. Clunky, classically inspired, aether-like foams, strings, and loops need not apply.

The answer to this riddle lies elsewhere.

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[1] A. Albert et al. (HAWC Collaboration), *Constraints on Lorentz invariance violation from HAWC observations of gamma rays above 100 TeV*, Physical Review Letters **124**, 131101 (2020). <https://arxiv.org/abs/1911.08070>