

Quantum Gravity Experiments at Potentially Low Cost

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Essay

One of the more damaging misunderstandings arising from infinities-are-free, math-first modeling of experimental reality is the belief that quantum gravity only emerges at “Planck foam” scales so tiny and energetic that no experiment can reach them. In sharp contrast, a low-resolution universe [1] with a KNS 8 vacuum [2][3] requires replacing the concept of self-existing spacetime with a finite-resolution fabric of relationships between matter and energy [4].

For high levels of mass and energy, this fabric’s dynamics become indistinguishable from those provided by the curvature of an infinitely smooth spacetime. For lower mass and energy levels, however, a finite number of entanglements comparable to the number of fermions and bosons in the objects implements the fabric. Quantized gravity experiments thus become accessible at scales more aligned with ordinary quantum physics.

The approach would be to measure gravitational attraction between two tiny objects of comparable size as the separation between them increases. Around the distance at which measurable attraction disappears, the drop-off should become quantized. Note that *both* objects must be exceptionally small. A single human-scale object attracting one hydrogen atom would still exhibit vanishingly smooth gravitational dynamics due to the immense number of fabric links available from the human-scale object.

This experiment would be challenging since the gravitational force between two amoebas might be too smooth for detectable gravitational quantization. Nonetheless, compared to Planck-scale experiments, the experimental costs of clever strategies could prove low enough to make them as accessible not just to massively funded groups but also to small universities and research groups. It would be delightful if some small, minimally funded group could prove the reality of gravitational quantization via this path.

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- [1] T. Bollinger, *The Gentle Trio Interpretation of the Standard Model, Relativity, and Quantum Mechanics*, Apabistia Notes (2019).
<https://sarxiv.org/apa.2019-02-23.2113.pdf>
- [2] T. Bollinger, *Thermal Gravity and Quantum Collapse*, Apabistia Notes (2023), page 1. <https://sarxiv.org/apa.2023-02-09.0000.pdf>
- [3] R. L. Kuhn, *Levels of Nothing: There Are Multiple Answers to the Question of Why the Universe Exists*, *Skeptic Magazine* **18**, 34 (2013).
https://www.researchgate.net/profile/Robert-Kuhn-2/publication/342852089_Levels_of_Nothing_-_Robert_Lawrence_Kuhn_-_Skeptic_magazine_-_2013/links/61020363169a1a0103c39442/Levels-of-Nothing-Robert-Lawrence-Kuhn-Skeptic-magazine-2013.pdf
- [4] T. Bollinger, *Thermal Gravity and Quantum Collapse*, Apabistia Notes (2023), pages 2-3. <https://sarxiv.org/apa.2023-02-09.0000.pdf>