Whereas Carlo Rovelli and Geoff Penington firmly believe that gravity is better described by a quantum theory.

And whereas Jonathan Oppenheim is more sympathetic to other possibilities (i.e. doesn't have a clue),

Oppenheim and Rovelli/Penington accept a wager at 1:5,000 odds

That space-time is described by quantum theory.

This will be determined by any of the following considerations:

1. *the creation of entanglement mediated by gravity [1-3]*

2. *a violation of the decoherence vs diffusion-trade off [4]*

3. *any other mutually acceptable experimental proposal*

4. *the discovery of a mutually acceptable UV complete and consistent theory of gravity*

The failure to create gravitationally mediated entanglement is to be regarded as evidence that space-time is classical. Absent a convincing mechanism from quantum theory, the direct detection of gravitational diffusion or gravitationally induced decoherence is evidence pointing towards gravity having classical properties.

Should space-time be shown to be quantum, the loser will give to each of the winners, one ITEM* of their choice. If the alternative hypothesis is deemed to be correct, the losers will each give 5,000 ITEMS to the winner.

* ITEM is defined to be a object of the winner's choice, worth no more than 20 British pence on January 21st, 2021. Examples include some crisps, a bazinga ball, a small amount of olive oil, balsamic vinegar, or wine.

Jonathan Oppenheim   Carlo Rovelli   Geoff Penington

Waterloo, Canada, November 2022 (following from
https://twitter.com/postquantum/status/1352292956385009671)

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[3] C. Marletto and V. Vedral, Physical Review Letters 119, 240402 (2017)
[4] JO, Carlo Sparaciari, Z. Weller-Davies, B. Šoda, https://arxiv.org/abs/2203.01982