

## Phenomenology 2022 Symposium: From Virtual to Real



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## Bound on Quantum Gravitational Wave Fluctuations from LIGO

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Gravitational wave observations at LIGO are in good agreement with classical predictions, with a residual that does not exhibit any unexplained correlations. In the context of general relativity as an effective quantum theory, gravitational waves have been thought to be in the most classical coherent state, in which quantum fluctuations are far too small to see at LIGO. Alternatively, it is plausible to suppose that gravitational waves may be produced in a more interesting *squeezed* state, in which quantum fluctuations can be exponentially enhanced by the squeezing parameter, as pointed out in recent work. Computing space and time correlations of a class of squeezed gravitational wave states and taking into account the detector response, a simple comparison to LIGO data puts a bound on the squeezing parameter.

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