Abstract Submitted
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Bohmian Quantum Gravity[1] THOMAS ANDERSEN, Univ of Guelph — The recent experimental proposals by Bose et al. and Marletto et al. (BMV) outline a way to test for the quantum nature of gravity by measuring gravitationally induced differential phase accumulation over the superposed paths of two 10-14 kg masses. BMV outline the expected outcome of these experiments for semi-classical, quantum gravity and collapse models. BMV finds that both semi-classical and collapse models predict a lack of entanglement in the experimental results. This work predicts the outcome of the BMV experiment in Bohmian trajectory gravity - where classical gravity is assumed to couple to the particle configuration in each Bohmian path, as opposed to semi-classical gravity where gravity couples to the expectation value of the wave function, or of quantized gravity, where the gravitational field is itself in a quantum superposition. In the case of the BMV experiment, Bohmian trajectory gravity predicts that there will quantum entanglement. This is surprising as the gravitational field is treated classically. A discussion of how Bohmian trajectory gravity can induce quantum entanglement for a non-superposed gravitational field is put forward.

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