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Testing Quantum Gravity with Gravitational Waves

ADRIAN DEL RIO VEGA, Institute for Gravitation and the Cosmos, The Pennsylvania State University.

We will argue that gravitational-wave astronomy has the potential to provide information on quantum aspects of black holes. Black hole area quantization, as predicted by Bekenstein, could impart observable imprints on the gravitational-wave signal originated in a binary black hole merger by affecting its absorption properties. These imprints include gravitational-wave echoes after the ringdown and suppressed tidal heating during inspiral phase. This phenomenology is within reach of future gravitatinal-wave detectors, and could be used to measure the fundamental quantum of black hole area, thereby opening experimental avenues to test the predictions of quantum gravity theories.