

# Observation of a gravitational Aharonov-Bohm effect and its implications for quantum superpositions of Newtonian gravitational fields

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The gravitational interaction of a tungsten source mass with atomic wavepackets has been observed in an atom deBroglie wave interferometer, in a regime where the separation distance between the interfering wavepackets is comparable to their distance to the source mass. We will discuss this experiment in the context of Aharonov-Bohm effects. We will describe the relevance of these results to observation of quantum superpositions of Newtonian gravitational fields and also to next generation tests of the equivalence principle based on atom interferometry.