

# Gravity and the Superposition Quantum Principle

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The relation between gravity and quantum mechanics is investigated in this work. The link is given by the wave packet expansion process, rooted from the Uncertainty Principle.

The wave packet spreading is studying in spherical coordinates, whose width  $\sigma(t)$  is expressed in terms of  $G$  and  $c$ , instead of  $\hbar$ . Therefore, for masses larger than the Planck mass, a faster dispersion rate of  $\sigma(t)$  is obtained, compared to the standard case. The dispersion of the wave packet is observed only by a free falling observer and the process stops once the observer hits the surface of the object. Different observers notice different rates of expansion of the wave packet and the source of gravity is in a quantum superposition.

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