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[back to namelist](#)

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Newton Force from Wave Function Collapse: Speculation and Test

One of the hypothetic models of quantum-classical boundary is gravity-related spontaneous wave function collapse. The decoherence effect of the collapses is masked by the overwhelming environmental decoherence. Experiments are under way to make the small effect detectable, by suppressing the environment. The collapses themselves are not masked by the environment. I extend the model and propose that collapses are responsible for the emergence of the Newton force between massive objects. I identify the collapse rate, possibly of the order of 1ms, with the rate of emergence of the Newton force. A simple heuristic emergence (delay) time is added to the Newton law of gravity. No available experimental evidence exists against it. Confirmation or refutal can be done in feasible modern Cavendish experiments with the moving source and of better time-resolution w.r.t. to the old tests.

L. Diósi: Gravity-related wave function collapse: mass density resolution

J. Phys. Conf. Ser. 442,012001-(7) (2013)

L. Diósi: Note on Possible Emergence Time of Newtonian Gravity

Phys. Lett. A377, 1782—1783 (2013)

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