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Quantisation of Gravity or Gravitisation of Quantum Mechanics? - Meanings of semi-classical gravity, the Schroedinger-Newton equation, and experimental tests

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That gravity has to be quantised is usually considered an accepted truth
among most physicists. However, there is virtually no conclusive evidence
for this. The most obvious way to merge Quantum Mechanics with fundamentally
classical gravity is provided by semi-classical gravity. For non-relativistic quantum systems this approach yields the Schr?dinger-Newton equation, a non-linear, non-local equation for the dynamics of the wavefunction. We will review the arguments for and against this approach, and discuss its consequences and prospects for experimental tests.

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