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Experimental Explorations of Quantum Macroscopicity

The quantum superposition principle conspicuously violates our classical concepts of locality and/or reality when it is realized with massive objects in states that would count as ‘mutually exclusive’ in our macroscopic world. We discuss different notions of “macroscopic” and focus in particular on a measure of macroscopicity which has been recently introduced by Nimmrichter and Hornberger to compare the non-classicality of experiment independent of their detailed realization. This relates to a generalized class of continuous spontaneous localization models. Since advanced quantum interference experiments are most promising for corroborating or falsifying such models we will review the current state of the art in high-mass matter wave physics and future perspectives.

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