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Semi-classical Approximations Based on Bohmian Mechanics

Abstract

Semi-classical approximations to quantum theory describe part of the system classically and part quantum mechanically. In the usual approach, one considers the classical system to move under a mean force, obtained by averaging over the quantum system. We consider an alternative approach based on Bohmian mechanics. This approach has been shown to yield better results than the mean force approach for certain non-relativistic systems. We discuss how a Bohmian semi-classical approach can be found for quantum electrodynamics and quantum gravity.