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Title:	Novel method for simulation of laser-matter interaction
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Keywords:	Novel method interaction laser-matter
Issue Date:	Apr-2022
Publisher:	IISER Mohali
Abstract:	Recent advances in the precision and strength of lasers mean that a host of new phe- nomena of laser-matter interactions is now accessible to experimentalists. This has led to the need for new theoretical and computational means of describing the laser-matter in- teractions, which can then be used to explain the experimental results. A semi-classical Hamiltonian can be used to describe a quantum system's interaction with high intensity, oscillating laser field. The present work employs the (t,t') formalism in the Chebyshev polynomials intending to replace the time-dependent Hamiltonian with a time-independent Hamiltonian. This allows us to solve the time-dependent Schrödinger equation (TDSE) for a quantum system much more easily as it bypasses the need for chronology in the time evolution operator since the time ordering operator is not required for solving the TDSE for time-independent Hamiltonians.
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