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## The soliton scattering of the cubic-quintic nonlinear Schrödinger equation on the external potentials (Conference Paper)

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### Abstract

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The Cubic-Quintic Nonlinear Schrödinger Equation (CQNLSE) is one of the universal mathematical models constituting many interesting problems in physics such as plasma physics, condensed matter physics, Bose-Einstein condensates, nonlinear optics, etc. This paper studies the scattering of the soliton of the CQNLSE on the localized external potential namely Gaussian potential. The approximate analytical method, also known as variational method has been applied in order to derive the equations for soliton parameters evolution during the scattering process. The validity of approximations was tested by direct numerical simulations of CQNLSE with soliton initially located far from potential. It was shown, in case of the potential in the form of Gaussian function, that depending on initial velocity of the soliton, the soliton may be reflected by potential or transmitted through it. The critical values of the velocity separating these two scenarios have been identified. © 2015 AIP Publishing LLC.

### Author keywords

nonlinear equations scattering Soliton variational methods

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