Summary: We discuss the quantum-mechanical scattering of a massless scalar field on a $\delta$-potential in a ghost-free theory and obtain analytic solutions for the scattering coefficients. Due to the non-locality of the ghost-free theory the transmission coefficient tends to unity for frequencies much larger than the inverse scale of non-locality, even for infinitely strong potentials. At the same time there exists a critical strength of the $\delta$-potential barrier below which there is always a frequency that is totally reflected. These scattering properties in ghost-free theories are quite generic and distinguish them from local field theories. Moreover, we study quasi-normal states that are present for the $\delta$-potential well. In the limit of vanishing non-locality, we recover the standard results of local field theory.

MSC:

81U15 Exactly and quasi-solvable systems arising in quantum theory

Keywords:

Lippmann-Schwinger equation; nonlocality; quasinormal modes; scattering coefficients

Software:

DLMF

Full Text: DOI arXiv

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