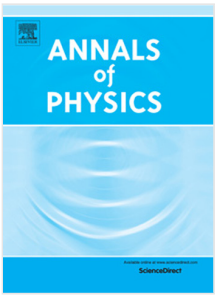

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Effects of Two Successive Parity-Invariant Point Interactions on One-Dimensional Quantum Transmission: Resonance Conditions for the Parameter Space

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Abstract

We consider the scattering of a quantum particle by two independent, successive parity-invariant point interactions in one dimension. The parameter space for the two point interactions is given by the direct product of two tori, which is described by four parameters. By investigating the effects of the two point interactions on the transmission probability of plane wave, we obtain the conditions for the parameter space under which perfect resonant transmission occur. The resonance conditions are found to be described by symmetric and anti-symmetric relations between the parameters.

Keywords:
one-dimensional quantum systems, transmission, resonance
PACS: 03.65.-w, 03.65.Xp, 03.65.Db

1. Introduction

The existence of various non-trivial junction conditions for a point interaction in one-dimensional quantum systems is an intriguing aspect in quantum mechanics. The property of the junction conditions was fully revealed by the mathematical works [1, 2, 3, 4] and has also been pointed out by a

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