Interaction of the neutron wave with a quantum objects moving with acceleration

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The report is devoted to a numerical study of the problem of interaction of the neutron with potential structures moving with constant acceleration. Among them were a potential step, a potential barrier, a potential well, a double potential stage, an interference filter, and a two-layer structure. The solution of the time-dependent Schrodinger equation was found by the method of evolution operator splitting. In all the cases considered the result of the interaction is a change in the velocity spectrum. In the first approximation the magnitude of the shift in the spectrum is determined by the product of acceleration by group delay time. Also, as the direction of acceleration reverses the effect changes its sign. The results are completely consistent with the idea of universality of the Effect of Acceleration [1] which consists in a change in the frequency of the wave at scattering on an object moving with acceleration.

Reference:

1. A.I. Frank, Physics-Uspeckhi, 63, 500-502 (2020).