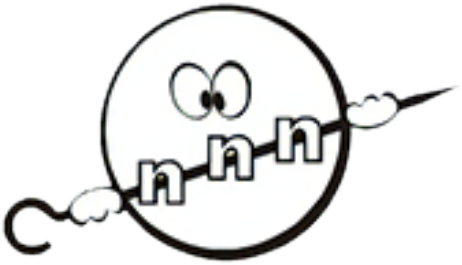

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Neutron Dispersion Law for Matter Moving with Acceleration

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The report is devoted to the problem of interaction of slow neutrons with matter moving with acceleration. The possibility of transformation of the neutron dispersion law due to the general effect of acceleration is considered. The Acceleration effect consists of that the result of the interaction of a particle with any object moving with acceleration should be a change in its frequency ω and energy E=ħω. This change in frequency is determined by relation $\Delta\omega \approx ka\tau$, where k is the wave number, a is the object acceleration and τ - interaction time.

The effect was investigated in an experiment [1] in which neutrons were observed passing through a sample moving with acceleration. The experimental results were in a quite well agreement with theoretical estimates, but the estimates were based on an assumption that dispersion theory is valid in the case of accelerated matter, which is not obvious.

Furthermore, there are theoretical estimates of acceleration at which phenomena associated with neutron wave re-scattering in matter become significant for the theory of dispersion [2]. At the same time the results of [3, 4] allow to suggest that the energy changes should take place by a single scattering on an accelerated nucleus.

In connection with the above, the calculation of corrections to the neutron dispersion law in the case of accelerated matter and the analysis of the possibility of their experimental observation becomes relevant. The report presents possible ways to solve this problem.

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