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Frequency shift at interaction of waves with accelerating object

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The report is devoted to the evolvement of views at the Accelerating Medium Effect, which consists in changing the frequency of a wave passing through a refracting sample moving with acceleration. At different times, theoretical predictions of such a change in frequency were made for electromagnetic waves passing through a dielectric plate moving with acceleration [1], neutron waves passing through an accelerated sample [2,3], and later for electron neutrinos passing through an accelerating layer of matter [4].
Experimental confirmation of these predictions was found only for neutron waves [5,6]. Since the phenomenon of refraction in a medium exists for waves of any nature, a conclusion was made in [5] about the very general nature of this optical effect.
However, from a simple consideration based on the principle of equivalence, it follows that the idea of the relation of the effect only with the refraction phenomenon is unreasonably narrow, and a change in the wave frequency should inevitably occur during scattering by any object moving with acceleration [7].
Such an object may be an elementary scatterer, a quantum object, or any device transmitting a signal. The effect is almost as general in nature as the well-known Doppler effect, but the frequency shift is determined not by the speed of the object, but by its acceleration. This relation with the Doppler effect is not accidental, since, with some reservation, the effect can be interpreted as the differential Doppler effect, in which the capture and emission of a wave are separated by the time interval during which the object's speed changes.
References
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