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Processes of Coherent and Incoherent Scattering of Charged High-Energy Particles in Ultra Thin Targets

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In the present paper there was investigated on the base of the quantum electrodynamics eikonal approximation the process of charged high-energy particles scattering in ultrathin targets. There was suggested a unified approach that allows one to consider the scattering of particles in this case in both amorphous and crystalline targets from a single point of view.

Particular attention was paid to the analysis of particles coherent and incoherent scattering processes in a crystal. There were considered different variants of the crystal axes and planes orientation with respect to the incident beam. It was shown that in the Born approximation the suggested method for describing the scattering process agrees with the analogous Ter-Mikaelian's results [1] for the interaction cross section of particles with a crystal. It was shown that particles scattering on the crystalline atoms planes is significantly asymmetric process. In this case, there are possible conditions when scattering characteristics as in an amorphous medium occur in the particles scattering along the plane, while in the transverse direction the scattering process has a coherent character.

[1] M.L. Ter-Mikaelian. High-energy electromagnetic processes in condensed media. New York, Wiley-Interscience, 1972

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