Channeling 2018



Contribution ID: 148

Type: Oral presentation

Observation of the X-ray Cherenkov Effect Near 100 eV Photons Energy

Tuesday, 25 September 2018 09:30 (15 minutes)

Recently [1] we have reported about the observation of the Cherenkov effect on the L-edge of the absorption of the aluminium. In the present report new results are provided in experimental study of the X-ray Cherenkov effect with photons energy about hundred eV. Using an electron beam with energy of 5.7 MeV, we observed the Cherenkov effect on Si and Be target with a photon energy of about 99.8 eV and 111 eV, respectively. The experimental result on the observation of the Cherenkov effect with Si on the jump of the susceptibility of the L-edge agrees well with an earlier observation of this phenomenon in [2, 3]. The result with Be foil was observed for the first time. In this case the Cherenkov effect was observed at about 111 eV of the photon energy, which corresponds to K-edge absorption of the radiation in the Be. All measurements were carried out using the electron beam of Tomsk microtron [4]. The intensity of the angular distributions of the radiation was investigated using a multilayer mirror {Mo / B4C}100 with a period d = 7.65 nm. In this report the experimental results are compared with calculation. Also the observation possibility of the Cherenkov effect with other kind materials, for example, S, Ba, La, Ce are discussed.

This work was partially supported by the Federal Targeted Program of the Russian Federation agreement no. 14.578.21.0198 (RFMEFI57816X0198).

References

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Session Classification: S2.3 Channeling & Radiations in Various Fields