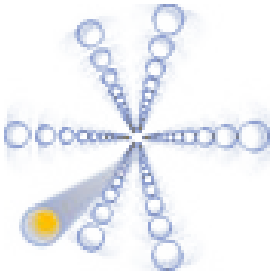

Contribution ID: **82** Type: **Poster**

PS2-04: Interference Effects in Angular Distributions of X-Ray Transition Radiation from Relativistic Heavy Ions Crossing a Plate: Influence of Absorption and Slowing-Down

Tuesday, 7 October 2014 17:00 (1h 30m)

When the relativistic heavy ions (RHI) penetrate through the thin solid amorphous target (plate) with a constant velocity, two types of electromagnetic radiation may appear: Cherenkov radiation (ChR) (optically transparent plate) and transition radiation (TR) –in optical and/or in X-Ray regions. The RHI bremsstrahlung is strongly suppressed (compared to relativistic electrons) due to large mass of RHI. In fact, the velocity of RHI slightly decreases during penetration through a plate due to ionization energy loss (slowing-down) and it changes the spectral-angular distributions both of ChR and TR. The influence of the slowing-down on the spectral-angular properties of ChR has been recently investigated, see e.g. [1-4] and references therein. According [1-4], the slowing-down of RHI in a plate leads to specific broadening of ChR ring and appearance of diffraction-like ChR spectral and angular distributions, which are different compared to the Tamm-Frank distributions.

Here, we present theoretical analysis and calculations of X-Ray TR angular distributions from RHI crossing a plate. The physical reason for appearance of new peculiarities is connected with interference of two waves emitted at entrance and exit of the plate. These waves are emitted by RHI crossing the boundary vacuum-plate and plate-vacuum with slightly different velocities, as it first considered in [5]. Besides, a first wave is partially absorbed during penetration through a plate. Both two factors may change the condition of constructive interference compared to a case of relativistic electrons, see, e.g. [6].

The key parameters here are the plasma frequency, photon energy, attenuation length and thickness of the plate, and slowing down (stopping) of RHI, which in turn is a complicated function of the energy, charge and mass of RHI.

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