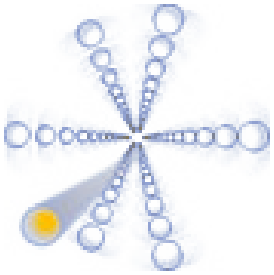

Contribution ID: **41** Type: **Poster**

PS2-08: X-Ray Polarization Radiation from Electrons Moving through Hole with Variable Radius

Tuesday, October 7, 2014 5:00 PM (1h 30m)

The nature of polarization radiation is the dynamic polarization of the material by the Coulomb field of passing particles [1]. Depending on the conditions the different types of polarization radiation can occur: Cherenkov radiation (CR), transition radiation, diffraction radiation, Smith-Purcell radiation (SPR) and so on. Sometimes simultaneously two or more mechanisms can take place and then the question arise about the optimal conditions of radiation. For example, in our previous work [2] we showed that in tube with variable radius (SPR+CR) there may occur more intensive sourse in Thz frequence domain then a tube with constant radius (CR). Now we explore the same situation in X-ray range of frequencies and compare relative contributions of Cherenkov and Smith-Purcell mechanisms.

We investigate theoretically radiation in X-ray frequency range in conditions when electrons move inside the hole with variable radius. Because of periodicity the electrons can excite not only CR, but also Smith-Purcell (SPR) radiation along with CR. CR and SPR radiations can serve for noninvasive bunch diagnostics purposes and also as a good sourse of UV and X-Ray radiation, including, e.g., Free-electron laser based on the SPR effect [3]. In our calculations we use the method of polarization current density [1]. Electrons in bunch are considered to be distributed by the Gaussian law. The spectral-angular distribution is investigated for various parametrs of tube and bunch: sizes and frequency of radiation, numbers of strips, energy of electrons. The intensity of radiation from tube with variable radius is compared with radiation from tube with constant radius.

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