

Pic-Code Karat Simulation of Coherent Cherenkov Radiation From a Bunch Passing Through a Hollow Conical Target

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Authors of the work [1] have measured spectral and angular characteristics of the Cherenkov radiation generated by a bunch passing along axes of the hollow conical target. They used a complicated optical scheme to measure a transverse profile of the generated beam and, as a result, they observed distribution with a maximum along an axes instead an expected "ring structure".

In the report we present simulation results for an angular distribution of the radiation as well as the spectral distribution obtained by the PiC code KARAT for the condition of the experiment [1].

We show that in strict satisfaction of the condition $\theta_{cone} = \frac{1}{2}\theta_{cn}$ (θ_{cone} is an opening cone angle, $\theta_{cn} = \arccos(1/\beta n)$) is the Cherenkov angle, $\beta = v/c$, n is a refractive index) a propagating radiation beam is retained a hollow structure for distances much larger than a radiator length.

References

- [1] Norito Sei, Toshiharu Takahashi, Scientific Reports |7:17440| DOI: 10.1038/ s41598.

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