

COMPARATIVE MODELING OF BREMSSTRAHLUNG GENERATION BY A HIGH-ENERGY ELECTRON BEAM

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This study investigates bremsstrahlung generation during the interaction of a high-energy electron beam with a target-converter at relativistic and ultra-relativistic energies. The primary objective was to verify the accuracy of modeling this process using the PRIZMA software developed at the RFNC – VNIITF [1, 2]. The verification has been conducted by comparing the results with those obtained from GEANT4 [3], which is a widely recognized standard for Monte Carlo simulations in this class of problems [4]. Integral and spectral characteristics of the generated gamma radiation were analyzed. A review of the physical models used in the codes and their areas of applicability has been conducted. The analytical properties of the bremsstrahlung cross-section near the high-frequency boundary of the spectrum have been investigated. Some hypotheses were proposed regarding the reasons for discrepancies in the modeling outcomes at energies close to the initial energy of the electron beam [4–6].

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