



Contribution ID: 43

Type: poster

Crab crossing in inverse Compton scattering of diverging beams

Monday, 5 June 2023 18:15 (1 minute)

Generalized theory of Compton backscattering in terms of luminosity, suitable for both classical and quantum regimes obtained. Optimal parameters, which require a certain mutual orientation and inclination of the fronts of the laser and electron beams described by 3D Gaussians, correspond to the crab scheme. The scattering of diverging beams was also considered. The constructed theory not only predicts the optimal geometry for laser and electron beams but also describes the luminosity. Our results reveal the opportunity to sharply increase the luminosity of compact x-ray sources based on Compton/Thomson backscattering.

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Session Classification: PS: Poster Session