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Gamma Ray Sources using Imperfect Relativistic Mirrors JOSÉ TITO MENDONCA, Instituto Superior Tecnico, Lisboa, Portugal, ANTONIO SERBETO, Universidade Federal Fulminense, Rio de Janeiro, Brazil — In this work, the collective backscattering of intense laser radiation by energetic electron beams is considered. Exact solutions for the radiation field are obtained, for arbitrary electron pulse shapes and laser intensities. The electron beams act as imperfect nonlinear mirrors on the incident laser radiation. This collective backscattering process can lead to the development of new sources of ultra-short pulse radiation in the gamma-ray domain. Numerical examples show that, for plausible experimental conditions, intense pulses of gamma-rays, due to the double Doppler shift of the harmonics of the incident laser radiation, can be produced using the available technology, with durations less than one attosecond.

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