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P1.2019 Betatron radiation of high brightness from electron acceleration in the regime of laser bullet

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See the full abstract here:
http://ocs.ciemat.es/EPS2019ABS/pdf/P1.2019.pdf

Short laser pulse interaction with a rather dense gas plasma target may result in pulse propagation regime which maximize the charge of the high-energy electron bunches. This regime corresponds to laser pulse propagation in a self-trapping mode, where the diffraction divergence is balanced by the relativistic nonlinearity, so that the laser beam radius stays unchanged during pulse propagation over many Rayleigh lengths. Such regime occurs for near critical density where the pulse length exceeds both the plasma wavelength and the pulse width. Electron acceleration occurs in a travelling cavity with a high-frequency laser field filling and a longitudinal electrostatic single-cycle field (”light bullet”). High charge of accelerated electrons enables efficiently produce X-rays through betatron oscillations. This was demonstrated by using the 3D PIC simulation results for electron characteristics. It has been shown that 100 TW laser pulse is able to produce over 4.5x10^10 photons per shot with the photon energy over 5 keV.

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