

EuroNNAC and EuPRAXIA Workshop on Pilot Applications of Electron Plasma Accelerators (PAEPA)



Contribution ID: 33

Type: **not specified**

Inverse Compton scattering from plasma wakefield accelerated beams

Tuesday, 11 October 2016 16:35 (10 minutes)

Generation of hard photon pulses from inverse Compton scattering with plasma wakefield accelerated electron beams is presented. The high beam quality in terms of energy spread and divergence ensures low radiation bandwidth on the order of a few percent within fs-scale pulses. This scheme gets extended to decoupled and yet synchronized multicolor radiation pulses that enable unique control of temporal and spectral spacing. Properties of these beam/pulse pairs can be tuned independently and allow for a broad range of photon energies and delays while maintaining the narrow single-pulse bandwidth.

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Session Classification: Session 5: Applications