



Contribution ID: 168

Type: **Poster presentation**

Application of Timepix in LWFA experiments: high flux single shot measurement of betatron radiation from x-rays to gamma-rays

Tuesday, 5 July 2011 12:46 (1 minute)

Betatron radiation emitted by electrons accelerated in a laser plasma wakefield accelerator is a promising bright ultra-compact light source. The presence of the electromagnetic field of the laser in the accelerator can dramatically change the electron motion with an emission from soft-x-rays to gamma-rays. We studied the radiation properties in single-shot experiment using two different Timepix detectors, based on silicon and cadmium telluride respectively, to record the emitted betatron spectra. Compton side scattering technique has been used to extend the working range of Timepix both in maximum photon energy and flux.

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Session Classification: Poster Mini Talks V

Track Classification: Applications