Laser-Plasma Accelerators Workshop



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Characterization of a laser-plasma betatron source for high resolution x-ray imaging

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Betatron radiation from laser-plasma accelerators has distinctive features: bright[1,2] broadband, micron scale source size, and ultrashort pulse duration of the order of femtoseconds. Betatron radiation has been success-fully used for X-ray imaging, including single[3] shot phase contrast imaging[4] and multimodal imaging[5]. Pushing betatron-based imaging to higher and higher resolution depends on the source properties as well as on the versatility and robustness of the imaging technique adopted. Here we review the key parameters of the betatron source and their characterization as a function of the imaging modality. We present the current status and future prospective of betatron imaging, towards nanoscopy at the femtosecond.

[1] Kneip, S. et al. (2010), Nat. Phys. 6 (980-983).

[2] Cipiccia, S. et al., (2011), Nat. Phys. 7 (867-871).

[3] Wood, J. et al. (2018) Sci Rep. 8(1).

[4] Fourmaux, S. et al. (2011). Opt. Lett. 36 (2426).

[5] Doherty, A et al.(2023). Commun Phys 6, 288.

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