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Bright betatron X-rays for imaging applications

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We present recent results on betatron X-ray production and application in laser wakefield accelerators. After upgrading the Atlas Laser to 300TW, we have managed to produce electron beams of increased charge and energy, which accordingly leads to bright betatron X-rays. We detected up to 10^9 photons per shot with an average energy of 20 keV, which is sufficient to penetrate macroscopic samples for single-shot X-ray imaging. Based on our previous work on X-ray tomography of thin biological specimen [1], we successfully extended the technique to medically relevant applications by imaging a human bone sample.

References

[1] J. Wenz et al. Quantitative X-ray phase-contrast microtomography from a compact laser-driven betatron source. Nat.Comms. (2015)

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