Contribution ID: **57** Type: **Invited**

Imaging using Plasma Betatron Radiation

Thursday, 8 September 2016 14:50 (25 minutes)

Laser-wakefield accelerators driven by high-intensity short-pulse lasers are a proven compact source of high energy electron beams, demonstrating GeV acceleration over centimetre distances. One of the proposed uses for these accelerators is the driving of hard x-ray synchrotron light sources, which in this context is known as betatron radiation. Such sources have been shown to be bright, have small source size and high photon energy, and are therefore interesting for imaging applications.

Working with a novel accelerator configuration at the Astra-Gemini laser facility of the Rutherford Appleton Laboratory, UK, we improved the average betatron x-ray flux by more than a factor of 10 compared to previous experiments. This fact, coupled to the stability of the radiation source, facilitated the acquisition of phase-contrast images of soft tissue, absorption-contrast images of hard tissue, and full 3D tomograms of mouse neonates which required the recording of over 500 successive images. Such performance is unprecedented in the betatron field and indicates the usefulness of these sources in clinical imaging applications, scalable to very high photon flux without compromising source size or photon energy.

Primary author: Dr COLE, Jason (Imperial College London)

Presenter: Dr COLE, Jason (Imperial College London)

Session Classification: Multidisciplinary Applications