Contribution ID: **6** Type: **talk**

Phase-space reconstruction of low-emittance electron beams through betatron radiation in a laser-plasma accelerator at FLAME facility

Monday, 25 September 2017 16:30 (20 minutes)

A new methodology able to model and reconstruct the transverse phase space of low-emittance electron beams accelerated in the bubble regime of laser-plasma interaction is presented. The single-shot measurement of both the electron energy spectrum and the betatron radiation spectrum is shown to allow a complete measurement of the transverse emittance, including the correlation term. A novel technique to directly measure the betatron oscillation amplitude distribution is described and tested at the SPARC-LAB test facility through the interaction of the ultrashort ultraintense Ti:Sa laser FLAME with a He gas-jet target. Via the exposed technique the beam transverse profile is also retrieved. From the study of the electron transverse dynamics inside the plasma bubble, the nonlinear correlation between the betatron amplitude and the divergence, i.e. the angle with respect the acceleration axis, is found. The angular distribution of the electron beam inside the bubble is retrieved. The knowledge of the phase-space density allows a more accurate measurement of the transverse emittance with respect to previous paradigms.

Primary author: CURCIO, Alessandro (LNF)

Co-authors: MAROCCHINO, Alberto (LNF); CIANCHI, Alessandro (ROMA2); Mr ZIGLER, Arie (Racah Institute of Physics, Hebrew University, Jerusalem 91904, Israel); GIULIETTI, Danilo (PI); CHIADRONI, Enrica (LNF); BISESTO, Fabrizio Giuseppe (LNF); FILIPPI, Francesco (LNF); MIRA, Francesco (R); ANANIA, Maria Pia (LNF); FERRARIO, Massimo (LNF); PETRARCA, Massimo (ROMA1); SHPAKOV, Vladimir (LNF)

Presenter: CURCIO, Alessandro (LNF)

Session Classification: WG7_Parallel

Track Classification: WG7 - High Brightness Power Sources: from Laser Technology to Beam Drivers