



Contribution ID: 8

Type: talk

## Experimental investigation of high transformer ratio PWFA using photocathode laser based bunch shaping

*Monday, September 25, 2017 4:54 PM (18 minutes)*

Since the first considerations on beam driven plasma wakefield acceleration (PWFA) the energy transfer efficiency from drive to witness bunch has been the subject of detailed investigations. The energy transfer efficiency is mainly defined by the ratio of the accelerating fields in the witness to the decelerating fields in the driver bunch, the so called transformer ratio, as well as by the correlated homogeneity of deceleration in the driver. Several methods to maximise the transformer ratio have been introduced theoretically, where the most promising are based on long, shaped drive bunches. The difficulty of such methods is the creation and transport of such bunches. As they are longer than the plasma wavelength, they can be subject to several plasma instabilities preventing controlled acceleration.

After the first successful experimental demonstration of high transformer ratio PWFA at the Photoinjector test facility, DESY Zeuthen site (PITZ), which employed such long, shaped drive bunches, our efforts focus on the investigation of different driver bunch shapes, as well as advanced bunch shaping techniques. Simulations and experimental results on these investigations will be presented.

**Primary author:** LOISCH, Gregor (DESY Zeuthen)

**Co-authors:** Dr MARTINEZ DE LA OSSA, Alberto (DESY and Universität Hamburg); Dr OPPELT, Anne (DESY Zeuthen); Prof. GRÜNER, Florian (CFEL and Universität Hamburg, Germany); Dr STEPHAN, Frank (DESY, Zeuthen site); Dr ASOVA, Galina (INRNE, Sofia, Bulgaria); Dr HUCK, Holger (DESY Zeuthen); GOOD, James (DESY Zeuthen); Dr OSTERHOFF, Jens (DESY); Dr GROSS, Matthias (DESY Zeuthen); Dr KRASILNIKOV, Mikhail (DESY Zeuthen); Mr LISHILIN, Osip (DESY Zeuthen); BOONPORNPRASERT, Prach (DESY Zeuthen); Dr RENIER, Yves (DESY Zeuthen)

**Presenter:** LOISCH, Gregor (DESY Zeuthen)

**Session Classification:** WG1\_Parallel

**Track Classification:** WG1 - Electron Beams from Plasmas