Contribution ID: **15** Type: **poster**

Application of a PWFA to a X-ray FEL

Monday, 14 September 2015 20:00 (30 minutes)

Linac based X-ray FELs impact many fields of science. Some experiments require larger photon flux and shorter wavelength. Increasing the beam energy increases the pulse energy and decreases the radiation wavelength.

We explore with numerical simulations the possibility of using a plasma wakefield accelerator scheme to increase the beam energy without significantly increasing the accelerator length.

As an example we consider parameters of the Swiss FEL beam.

For the witness bunch, we assume the parameters envisaged for normal operation at 5.8 GeV. We determine the plasma and drive bunch parameters to double the witness bunch energy in a meter-scale distance. In order to preserve the witness bunch emittance, the PWFA has to operate in the non-linear regime. Loading of the plasma wake is necessary to keep the final energy spread at an acceptable level.

We study two options for the incoming witness bunch energy. In the first option the bunch enters the plasma with the full linac energy (5.8 GeV). In the second one, it has the energy reached after the accelerator second bunch compressor (2.1 GeV).
Numerical simulations are preformed in 2D cylindrical symmetry with the code OSIRIS. Initial results will be presented.

Primary author: Ms ISRAELI, Yasmine (Max Planck Institute for Physics)

Co-authors: Dr VIEIRA, Jorge (Instituto Superior Tecnico); Prof. SILVA, L. (IST); Dr PEDROZZI, M. (PSI); Prof. MUGGLI, Patric (Max-Planck-Institut für Physik); Dr REICHE, S. (PSI)

Presenter: Ms ISRAELI, Yasmine (Max Planck Institute for Physics)

Session Classification: Poster Session 1 (WG1-WG2-WG3-WG4) and Wine

Track Classification: WG4 - Application of compact and high-gradient accelerators/Advanced beam manipulation and control