Contribution ID: **60** Type: **poster**

Injection of electrons into the wakefield over a smooth plasma density entrance

Wednesday, 16 September 2015 20:00 (30 minutes)

This work is related to the AWAKE project at CERN. It is a plasma wakefield acceleration experiment designed to test the possibility of transferring energy from the 400 GeV proton beam to electrons through a plasma. In the experiment, the vacuum beam line and the plasma cell have different gas pressures, which results in a plasma density transition region between them. Electron trapping is well understood for the case of a sharp increase in the plasma density. However, the previously found optimal parameters cannot be used in the case of a smooth increase of the plasma density because of defocusing of the electrons in the transition region. This effect is associated with the slowly changing component of wakefield potential. Injected electrons are not trapped by the plasma-frequency component of the wakefield, as this component averages out because of quick change of the local plasma frequency. The proton beam current interacts with the plasma in such a way that the electrons are defocused. Nevertheless, the injection is possible if the electrons stay outside the plasma until the end of the transition region. Numerical simulations with LCODE prove this idea.

Primary author: Mr TUEV, Petr (Novosibirsk State University)

Presenter: Mr TUEV, Petr (Novosibirsk State University)

Session Classification: Poster Session 2 (WG5-WG6-WG7) and Wine

Track Classification: WG6 - Theory and simulations