Contribution ID: **17** Type: **poster**

Amplification of a Surface Electromagnetic Wave by a Running Over Plasma Surface Ultrarelativistic Electron Bunch as a New Scheme for Generation of Terahertz Radiation

Monday, 3 June 2013 19:30 (30 minutes)

The surface electromagnetic waves (SEW) on plasma-like media attract special attention of researchers due to their unique properties. The SEW are widely applied in physical electronics due to its high close to light phase and group velocity leading to its uncomplicated generation by relativistic electron bunches and output from plasma. We discuss the theoretical problem of SEW amplification with the help of ultrarelativistic monoenergetic electron bunch running over flat plasma surface. Such a problem of generation of three-dimensional electromagnetic wave (wakefields) in plasma with the help of ultrarelativistic electron and ion bunches through Cherenkov resonance radiation was solved in our earlier work. In the present work we apply this method. It is shown that when the ratio of electron bunch number density to plasma electron number density multiplied by a powered to 5 relativity factor is much higher than 1, the SEW saturation electric field induced by trapping of bunch electrons gains the magnitude ~ 10^11 V/m, the energy density flux (Poyinting vector) ~ 10^15 W /cm2 and does not approach the surface electromagnetic wave front breakdown threshold in plasma. Here, we discuss the possibility of generation of superpower Teraherz radiation on a basis of such scheme.

Primary authors: Prof. RUKHADZE, Anri Amvros'evich (Prokhorov General Physics Institute RAS); Dr SADYKOVA, Saltanat Polatovna (DESY, Hamburg)

Co-authors: Dr KHISHCHENKO, Konstantin V. (Joint Institute for High Temperatures RAS); Prof. SAMKHARADZE, T. G. (Prokhorov General Physics Institute)

Presenters: Dr KHISHCHENKO, Konstantin V. (Joint Institute for High Temperatures RAS); Dr SADYKOVA, Saltanat Polatovna (DESY, Hamburg)

Session Classification: Wine and Poster Session

Track Classification: Wine and Poster Session