ID contributo: **336** Tipo: **Oral contribution**

Electron beam self-focusing and X-ray radiation in a self-ionized plasma wakefield accelerator

giovedì 21 settembre 2023 17:45 (20 minuti)

The E300 experiment at FACET-II on PWFA relies on electron and X-ray/γ-ray detectors to measure the beam dynamics and assess its matching in plasma, with the aim of preserving the beam quality, one of the most important milestone for the field. The plasma accelerator was operated in a self-ionized hydrogen plasma. The electron beam had a large enough peak current and density to trigger some level of ionization of the gas. Observations revealed a strong beam-plasma interaction over several meters, with the 10 GeV beam transferring more than half of its energy to plasma, and with bright betatron X rays being emitted. Dedicated detectors enabled the characterisation of the betatron radiation at different plasma densities, with photon energies in the 10-100 keV range. They allowed to infer a beam size in the plasma and a betatron oscillation amplitude of a few μm, thus providing an evidence of the beam self-focusing in the self-ionized plasma. This is confirmed by the data taken with the 20 GeV FACET-I beam, with gamma range betatron radiation and photon energies exceeding 10 MeV. We report on these results highlighting how the characterization of betatron radiation can provide crucial insight into the beam dynamics for PWFA.

Autore principale: Sig.na ZAKHAROVA, Viktoriia (LOA)

Relatore: Sig.na ZAKHAROVA, Viktoriia (LOA)

Classifica Sessioni: WG1:Plasma-based accelerators and ancillary components

Classificazione della track: WG1: Plasma-based accelerators and ancillary components