



Contribution ID: 104

Type: **Invited talk**

Electron bunch seeding of the self-modulation instability in plasma

Monday, 19 September 2022 16:25 (20 minutes)

We show experimentally that the self-modulation instability of a long 400 GeV proton bunch can be seeded by a preceding short 18 MeV electron bunch. We prove that the timing of the self-modulation is reproducible from event to event, and that it is controlled by the timing of the seed bunch. We show that the amplitude of the seed wakefields depends on the parameters of the seed electron bunch, and that the growth rate of the self-modulation depends on those of the proton bunch.

The electron bunch seeding of the self-modulation in plasma is an important milestone on the path towards proton driven plasma wakefield acceleration of electron bunches, with quality and energy suitable for high-energy physics application, such as in the AWAKE experiment.

Primary author: VERRA, Livio (CERN)

Co-authors: ZEVI DELLA PORTA, Giovanni; GSCHWENDTNER, Edda (CERN); BERGAMASCHI, Michele (Max-Planck-Institut für Physik/CERN); NECHAEVA, Tatiana (Max-Planck-Institut für Physik (DE)); PUCEK, Jan (Max-Planck Institute for Physics); MUGGLI, Patric (Max-Planck-Institut für Physik)

Presenter: VERRA, Livio (CERN)

Session Classification: Special Topic