Contribution ID: **177** Type: **Oral presentation**

Advanced Accelerator Developments at EuPRAXIA@SPARC_LAB

Thursday, 27 September 2018 16:50 (30 minutes)

On the wake of the results obtained so far at the SPARC_LAB test-facility at LNF, we are currently investigating the possibility to design and build a new multi-disciplinary user-facility, equipped with a soft X-ray Free Electron Laser (FEL) driven by a ~1 GeV high brightness linac based on plasma accelerator modules in the framework of the H2020 Design Study EuPRAXIA. EuPRAXIA@SPARC_LAB is conceived as an innovative and evolutionary tool for multi-disciplinary investigations in a wide field of scientific, technological and industrial applications. It could be progressively extended to be a high brightness "particle beams factory" able to produce electrons, photons (from THz to γ-rays), neutrons, protons and positrons, that will be available for a wide national and international scientific community interested to take profit of advanced particle and radiation sources. This fundamental goals will be integrated in the LNF facility by using a high gradient X-band RF linac and the high power laser FLAME to drive Plasma Oscillations in the accelerator module. This activity is performed in synergy with the EuPRAXIA and CompactLight design studies. In this talk we report about the recent progresses in the on going design study and about opportunities and perspectives for the high brightness beam physics scientific community.

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Session Classification: S5.2 Novel Sources: FEL/Laser/Plasma