

EuPRAXIA: European plasma research accelerator with excellence in applications.

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Particle accelerators based on RF technology have seen a tremendous progress over the last 90 years, opening a multitude of applications in science, industry and medicine. In particular accelerator-based photon science has become a rapidly growing and highly successful field of science. A new particle acceleration concept is based on plasma devices that are excited by lasers or beams. These plasma accelerators have demonstrated accelerating fields that are up to 1000 times higher than in RF accelerators, opening a route towards highly compact and cost-effective particle accelerators. Today multi-GeV electron beams can be routinely produced in less than 10 cm. The Horizon2020 design study EuPRAXIA is developing the concept and the design for a future European research infrastructure that is based on this new technology and would be used to develop applications in various fields. Given the compact nature and strong transverse fields in plasma accelerators, photon emission is a natural feature. Photon science applications are attractive and also on the verge of practicality. The direction of our work, the prospects and the status of the EuPRAXIA project are presented. It is discussed how the novel technologies could complement the existing facilities, provide new features and open new application reach in photon science.