D R A F T

Conceptual Design Report for a European Research Infrastructure "European Plasma Research Accelerator with Excellence in Applications" (EuPRAXIA)

This document provides the conceptual design report for the worldwide first 5 GeV plasma-based accelerator with industrial beam quality and user areas. A consortium of 16 laboratories and universities from 5 EU member states has prepared this proposal. 16 associated partners from 8 countries joined with in-kind commitments and contributed to this report. The scientists involved represent world-class expertise from accelerator operation for photon science and HEP, design and construction of leading accelerators like LHC and Soleil, advanced acceleration test facilities like SPARC and frontier laser projects like CLF, CILEX-APOLLON and ELI. EuPRAXIA is the required intermediate step between proof-of-principle experiments and ground-breaking, ultra-compact accelerators for science, industry, medicine or the energy frontier ("plasma linear collider"). The presented design includes innovative concepts and cutting edge components from the fields of accelerator technology, high power lasers, plasma sources, diagnostics, digital feedbacks, as well as latest detector and users equipment. Industry has been involved in the design work and will be the supplier of the required high tech equipment. A European implementation model is being proposed with distributed construction of components and installation at one central site. Several possible sites in Europe have been studied and cost estimates have been worked out. EuPRAXIA is designed to make optimal use of past investments in European scientific infrastructure and will develop these investments into ground-breaking applications for multiple fields. EuPRAXIA will support or establish international technological and scientific leadership for novel accelerators and their applications.

This conceptual design report provides the decision makers in Europe with the required information for a decision on the construction of such a highly innovative research infrastructure for European science, industry and society.

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List of all persons who have actively contributed input and/or text to the CDR. We include authors from partners and associated partners at same level.

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Includes measurement, correction, feedback?
Up- and downstream of plasma?

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Done by WP or done by DESY

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