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EuPRAXIA@SPARC_LAB – Overview on Beam Diagnostics

EuPRAXIA@SPARC_LAB will be a user-oriented X-ray free-electron laser, based on plasma wakefield acceleration. A 20 pC, 500 MeV witness electron bunch will be injected in plasma with density $\sim 10^{16} \text{cm}^{-3}$, accelerated to $>1 \text{ GeV}$ and delivered to undulators for generating radiation in the water-window region ($\sim 4 \text{ nm}$).

To preserve beam quality upon acceleration in plasma, the envelope of the witness bunch must be matched to the focusing force present in the ion column generated by the 500 pC drive bunch. In this contribution, we discuss the requirements for the measurement of transverse size and position of the witness bunch the plasma entrance, as well as the other compact diagnostics needed along the RF linac and the transfer line to the undulators.

Working group

WG5 : Beam sources, monitoring and control

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