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Transfer line design for EuPRAXIA@SPARC_LAB

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The transfer line that carries the electron beam from the plasma to the undulators is certainly a critical line in EuPRAXIA@SPARC_LAB as in all plasma driven Free Electron Lasers.

This machine section must serve multiple purposes: capturing the highly divergent bunches at the plasma exit, separating the driver bunch from the witness and finally matching the witness to the FEL undulators.

In addition, the line must be as compact as possible so as to best contain the chromatic outbreak of the beam. In this paper we present the results of the design and optimization phase of the transfer line taking into account important collective effects such as space-charge and coherent synchrotron radiation emission in the chicane.

Moreover, we show here our evaluations on the expected effect of chromatism after the plasma extraction on the witness and its core and the filtering procedure of the witness halo.

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Footnotes

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Yes

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