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Beam Dynamics Studies for the X-Band Linac of the EUPRAXIA@SPARC_LAB Project

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An advanced accelerator facility EUPRAXIA@SPARC_LAB has been proposed to be realized at Frascati (Italy) Laboratories of INFN in the framework of the Eupraxia Design Study. Two advanced acceleration schemes will be applied: an ultimate high gradient 1 GeV X-band linac together with a plasma acceleration stage to provide accelerating gradients of the GeV/m order. A FEL scheme is foreseen to produce X-ray beams within 3-10 nm range. A Compton backscattering Interaction is also planned together with extraction beamlines at intermediate electron beam energy for neutron beams and THz radiation production. The electron beam dynamics studies in the linac are here presented together with the preliminary machine layout.

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