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Towards 400 Hz RF system for EuPRAXIA@SPARC_LAB

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The EuPRAXIA@SPARC_LAB project aims to develop a free-electron laser (FEL) facility using beam-driven plasma wakefield acceleration with a plasma module powered by a high-brightness linear accelerator. The linac is designed to produce a beam up to 1 GeV at a repetition rate of 100 Hz, employing an S-band photoinjector and an X-band booster. An exciting prospect is upgrading the linac to a 400 Hz RF system, which could substantially enhance the facility's performance. This presentation will address the technical challenges and potential solutions related to modifying the X-band booster and injector for higher frequency operation, focusing on RF power generation, RF structures, and overall thermal management.

Presenter: CARDELLI, Fabio (Istituto Nazionale di Fisica Nucleare)