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Advancements in X-band technology at the TEX facility at INFN-LNF

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In anticipation of the Eupraxia@SPARC_LAB project at the INFN Frascati National Laboratories, an intensive testing and validation activity for the X-band RF system has commenced at the TEX test facility. The Eupraxia@SPARC_LAB project entails the development of a Free-Electron Laser (FEL) radiation source with a 1 GeV Linac based on plasma acceleration and an X-band radiofrequency (RF) booster. The booster is composed of 16 high-gradient accelerating structures working at 11.994GHz. All radiofrequency components comprising the basic module of the booster, from the power source to the structure, must undergo testing at nominal parameters and power levels to verify their reliability. For this reason, since 2021, several experimental runs have been conducted to test various components in X-band technology at the TEX facility. This paper presents the results obtained thus far from the different experimental runs, and it also outlines the future upgrade of the facility, which will enhance testing capabilities and the future prospects of the facility itself.

Footnotes

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