Contribution ID: 438 Contribution code: THPB015

Type: Poster Presentation

Validation of high efficiency klystron technology

Thursday 29 August 2024 16:00 (2 hours)

The delivery of high RF power—from hundreds of kW to MW—by klystrons, is linked with a high overall energy consumption. A research programme led by CERN in collaboration with the industry is being conducted to understand what limits klystron efficiency and how to develop high-efficiency klystrons. As a result of this program, two first prototypes of X-band (11.994 GHz) high-efficiency klystrons have been successfully designed and manufactured in collaboration with Canon Electron Tubes and Devices. The first results look promising, revealing a remarkable ~60% efficiency, and validating the proposed HE klystron technology. A comprehensive characterisation campaign has been conducted at CERN to verify and demonstrate these results. The methodology for the HEK tubes characterisation is based in two independent measurements: a RF power measurement, and a calorimetric methodology —less subject to calibration inaccuracies. We describe the setups, principle of the calorimetry methodology, and we discuss the feasibility and precision of the results.

Footnotes

Funding Agency

Primary author: ALONSO ARIAS, Paz (European Organization for Nuclear Research)

Co-authors: CHAUCHET, Alan (European Organization for Nuclear Research); MARRELLI, Chiara (European Spallation Source ERIC); SYRATCHEV, Igor (European Organization for Nuclear Research); WEBBER, Maggie (European Organization for Nuclear Research); BORONAT, Marça (European Organization for Nuclear Research); JONES, Matthew (Science and Technology Facilities Council); CATALAN-LASHERAS, Nuria (European Organization for Nuclear Research); GONZÁLEZ-ANTÓN, Sergio (European Organization for Nuclear Research); ZAIB, Un Nisa (Chinese Academy of Sciences)

Presenter: ALONSO ARIAS, Paz (European Organization for Nuclear Research)

Session Classification: Thursday Poster Session

Track Classification: MC4: Technology: MC4.6 RF power sources and power couplers