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## A power amplifier based on rad-hard gallium nitride FETs for the 10 MHz cavities of the CERN proton synchrotron

*Tuesday, 21 May 2024 16:00 (2 hours)*

The upcoming High-Luminosity Large Hadron Collider (HL-LHC) program requires a beam performance in the CERN Proton Synchrotron (PS) that is at the limits of the current RF systems. Following the discontinuation of the RF tube production of the driver amplifiers a new solid-state design has been developed using radiation-hard amplifier technology. In view that the current system architecture has reached its maximum achievable gain, the goal was to reduce the cavity impedance encountered by high-intensity circulating beams. This reduction is achieved by increasing the fast feedback gain around the 10 MHz cavities. A 400W modular driver amplifier based on GaN technology and its control system have been prototyped and are currently in the testing phase. The FETs have been qualified for radiation in J-PARC and they will undergo additional irradiation time in the PS tunnel at CERN to additionally qualify the amplifier in its entirety. The paper outlines the modeling phase, the challenges encountered during prototyping, and the achieved results.

### Footnotes

### Funding Agency

### Paper preparation format

LaTeX

### Region represented

Europe

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