



Contribution ID: 261 Contribution code: THP31

Type: **Poster Presentation**

Design and experimental testing of electronic flow measurement module in superconducting low-temperature module testing platform

Thursday, 12 September 2024 16:00 (1h 30m)

The electronic flow measurement module is a key component of the superconducting low-temperature module testing platform. Serving as a vital monitoring signal device within the coupler interlocking protection system, this module monitors the electronic cloud of high-energy power couplers and waveguide systems to ensure their effective protection. This article details the design and performance testing of the electronic flow measurement module, highlighting key technologies including anti-interference, weak current detection, multi-channel signal acquisition and processing, and weak current calibration. This module boasts a large dynamic range, high precision, and multi-channel weak current detection, featuring 32 detection channels with a maximum detection current of $10\mu\text{A}$. Its detection accuracy surpasses 1nA , and its response time is under 5ms. Additionally, the module's design takes into account the impact of ionizing and electromagnetic radiation on its performance to ensure its reliability and stability.

Footnotes

Funding Agency

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Yes

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Session Classification: THP: Thursday Poster Session

Track Classification: MC2: Beam Loss Monitors and Machine Protection