Contribution ID: **557** Contribution code: **SUP054**   Type: **Poster Presentation**

A Self-Supervied Transformer For RF Cavity Signal Denoising

Sunday 10 August 2025 15:00 (3 hours)

A frequent occurrence within industrial particle accelerator systems is electromagnetic noise accumulating within RF Cavity Sensor readings, attributed to their electromagnetically dirtier operating environments and production, with less of an emphasis on their performance optimization. This phenomenon prevents signals from accurately relaying information to beam operators and specialists. Additionally, noisy signals inhibit the ability for feedback loops to meet their regulation requirements, making machine control much more difficult. Previous work has shown machine learning-based techniques as promising solutions for denoising that maintains signal quality and features. In this paper, we design, implement, and benchmark a self-supervised transformer-based machine learning algorithm that denoises In-Phase and Quadrature (I/Q) RF Cavity Signals without a need for referencing a clean ground-truth.

Please consider my poster for contributed oral presentation

Yes

Would you like to submit this poster in student poster session on Sunday (August 10th)

Yes

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

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