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Progress in Advanced Ferroelectric Technologies for Fast SRF Cavity Tuning

Friday 15 August 2025 10:10 (20 minutes)

In this talk, Euclid Techlabs, in collaboration with Jefferson Lab, Helmholtz-Zentrum Berlin (HZB), and CERN, will present recent advancements in ferroelectric material-based fast tuning systems for SRF cavities. Currently, the most common approach to managing fast cavity frequency shifts is to over-couple the fundamental RF power, which results in significant power waste. Recent developments in ultra-low-loss ferroelectric materials have made ferroelectric-based tuning technology for SRF cavities a viable alternative. The Horizon Europe iSAS project*focuses on improving accelerator efficiency and includes the integration of a ferroelectric fast reactive tuner (FE-FRT) to enhance energy conservation. Applications under this initiative include an FE-FRT for 400 MHz transient beam loading compensation in the LHC, FE-FRT systems for microphonics compensation in 1.3 GHz SRF cavities, FE-FRTs for energy recovery linac (ERL) applications, and retrofitting FE-FRTs into existing HL-LHC cryomodules**. In the U.S., FE-FRT technology is under active development for microphonics compensation in CEBAF and as a potential upgrade path for the Electron-Ion Collider (EIC), where it may serve as a dedicated hardware solution for active microphonics control in crab cavities.

Please consider my poster for contributed oral presentation

Yes

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

No

Footnotes

*https://isas.ijclab.in2p3.fr/*https://indico.ijclab.in2p3.fr/event/11291/overview

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

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