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## Traveling wave excitation results in SRF cavity with a feedback waveguide at 2K and narrow bandwidth

*Wednesday 4 June 2025 16:00 (2 hours)*

Conventional SRF cavities are used in standing wave regime and are limited by surface fields to  $\sim 50$  MV/m. In order to overcome this limit, Superconducting Traveling Wave (SCTW) cavity was proposed as it allows to achieve  $\sim 1.5$  times higher accelerating gradient operating at lower phase advance per cell, thus improving transit time factor. However, power recirculation through a feedback waveguide is required to maintain cavity efficiency. Funded by the U.S. Department of Energy's SBIR program, Euclid Techlabs, in collaboration with Fermilab, demonstrated in the past the surface processing capability of a single-cell prototype with a feedback waveguide. Subsequently, a 3-cell prototype was designed and fabricated to demonstrate a traveling wave regime in SRF cavity with a feedback waveguide at cryogenic temperatures and the highest gradients. Previously, we have demonstrated the feasibility of traveling wave excitation and control at 2K in the cavity with highly loaded  $QL=1e6$ , which is typical for high current machines. Here we present our recent results of traveling wave control with a more challenging smaller bandwidth.

### Footnotes

### Paper preparation format

Word

### Region represented

America

### Funding Agency

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