Contribution ID: **251** Contribution code: **THP043** Type: **Poster Presentation**

Impact of Phase and Amplitude Instabilities on Beam Performance in the FACET-II LINAC

Thursday 14 August 2025 16:00 (2 hours)

Maintaining RF stability in ageing accelerator infrastructure is essential for preserving beam quality and experimental integrity. At FACET-II, SLAC's advanced test facility for high-gradient acceleration research, we investigate the cumulative effects of RF phase and amplitude jitter across legacy LINAC stations. This study quantifies how RF-induced instabilities contribute to inefficient charge delivery, beam loss, and longitudinal decoherence. Using diagnostics such as SYAG and DTOT2, we assess jitter-induced impacts on dispersion and orbit stability, and examine potential convolution into transverse beam losses. Amplitude and phase jitter are analyzed station-by-station, with correlations drawn to beam performance. We also evaluate the role of thermal fluctuations in klystrons and waveguides, and consider whether insulation degradation in SLED cavities may contribute to observed drift. We explore operational strategies to mitigate jitter effects. This work supports improved RF efficacy for better energy delivery, orbit control, and performance in energy-sensitive experiments such as PWFA.

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

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

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