



Contribution ID: 47 Contribution code: TUP047-THA

Type: Student Poster Presentation

## Resolving Longitudinal Information of Electron Beam and FEL pulses Using Transverse Deflecting Cavity at Dalian Coherent Light Source

Tuesday 20 August 2024 20:40 (20 minutes)

Dalian Coherent Light Source (DCLS) is a free-electron laser (FEL) user facility in the vacuum ultraviolet wavelength region, operating in high-gain harmonic generation (HG) mode. Accurate diagnosis of the longitudinal phase space of electron bunch plays a critical role in beam tuning and FEL optimizing. Additionally, advanced user experiments have demonstrated a demand for determining the FEL pulse duration. To address this, an S-band radiofrequency transverse deflecting structure (TDS) has been installed and commissioned at the DCLS undulator exit. This paper provides a comprehensive overview of the TDS system, detailing its physical layout, diagnostic methods, and experimental results, allowing for the characterization of both the longitudinal phase space of electron bunch and the duration distribution of FEL pulse.

### Footnotes

### Funding Agency

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**Session Classification:** Poster session

**Track Classification:** Electron diagnostics, timing, synchronization & controls