Contribution ID: **1042** Contribution code: **THPB038** Type: **Poster Presentation**

Equivalent circuit analysis of waveguide filter

Thursday 5 June 2025 15:30 (2 hours)

Shanghai Synchrotron Radiation Facility/Shanghai Soft X-ray FEL Facility has developed an advanced transverse deflecting structure TTDS (two-mode transverse deflecting structure), using two different rf power sources to deflect beam in any angle. Bandpass filter is a key component in the TTDS, designed to pass low-frequency signals while blocking high-frequency ones. This study uses an equivalent circuit approach to analyze the RF performance of the bandpass filter. By calculating the required S-parameters, an equivalent circuit model is derived to guide the structure and dimension design. The equivalent circuit analysis not only provides valuable insights for the design and optimization of the bandpass filter in TTDS but also offers a useful reference for the design of other waveguide filters in accelerators.

Footnotes

Paper preparation format

LaTeX

Region represented

Asia

Funding Agency

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Session Classification: Thursday Poster Session

Track Classification: MC7: Accelerator Technology and Sustainability: MC7.T31 Subsystems, Technology and Components, Other