



Contribution ID: 97 Contribution code: WEP44

Type: Poster Presentation

## Mechanical design of high heat load front-end for IVU beamline at Korea-4GSR

*Wednesday 17 September 2025 17:00 (1 hour)*

The Korea-4GSR, to be built in Ochang, South Korea by 2030, is a new 4th generation synchrotron radiation facility. It is designed with an electron beam energy of 4 GeV, a stored electron beam current of 400 mA, and an emittance of 62 pm.rad. In Phase I, 10 beamlines will be constructed, five of which will use the IVU24 undulator. When the undulator gap is set to 5 mm, the X-ray source has a total power of 17.95 kW and peak power density of 165 kW/mrad<sup>2</sup>. The High Heat Load Front-End(HHLFE) system is designed to absorb up to 17kW of heat using a fixed mask and a movable mask, ensuring that only the central cone is transmitted to the beamline optical devices. The main materials are GlidCop or CuCrZr, selected for their high thermal conductivity, and the cooling channels are designed with a rectangular cross-section to maximize the heat exchange area for efficient thermal management. In addition, tungsten is applied to precisely shape and effectively absorb the X-ray beam. The structural design of the heat-absorbing devices was determined based on thermal analysis results\*. This presentation introduces the structural and mechanical design details of the HHLFE.

### Footnotes

\* Seung Nam Kim, Young Duck Yoon, Jong Ha Park, Hyung Seok Choi, Jehan Kim, "Thermal analysis of frontend vacuum components & mirror for IVU24 beamline at the Korea-4GSR", MEDSI 2025

### Funding Agency

**Author:** Mr PARK, Jongha (Pohang Accelerator Laboratory)

**Co-authors:** Mr CHOI, Hyung-seok (Pohang Accelerator Laboratory); KIM, Jehan (Pohang Accelerator Laboratory); KIM, Ki-jeong (Pohang Accelerator Laboratory); KIM, Sunnam (Pohang Accelerator Laboratory); YUN, Young Duck (Pohang Accelerator Laboratory)

**Presenter:** Mr PARK, Jongha (Pohang Accelerator Laboratory)

**Session Classification:** Wednesday Poster Session

**Track Classification:** BEAMLINES: Front Ends