



Contribution ID: 111 Contribution code: WEP31

Type: Poster Presentation

Flange aperture gap RF contact gasket for Elettra 2.0 storage ring

Wednesday 17 September 2025 17:00 (1 hour)

The fourth-generation X-ray source Elettra 2.0, currently under development, aims to significantly enhance the brilliance and coherence of the emitted light, with high currents and ultra-low emittances as design goals. Fourth generation machines have tight constraints in terms of beam coupling impedance, requiring that the flanged connections along the beam orbit contributes as less as possible to the storage ring impedance budget, either by reducing the flange aperture gaps ideally to zero (zero-gap flanges connections), or by properly shielding the cavities generated (RF contact fingers). Space constraints of Elettra 2.0 limit the usage of conventional RF contact fingers, and the storage ring includes components where zero-gap flanges connections cannot be applied. This paper presents a compact RF contact gasket designed to work within the constraints of Elettra 2.0 chambers, inside the cavity created by the coupling of two CF40 flanges. The geometry is presented, along with its characterization with finite element modeling and RF Impedance calculations. A presentation of prototypes is also included.

Footnotes

Funding Agency

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Session Classification: Wednesday Poster Session

Track Classification: ACCELERATORS: Storage Rings