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## Challenges and mitigation measures for synchrotron radiation impact on the FCC-ee arcs

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In a high-energy circular electron-positron collider like the Future Circular Collider (FCC-ee) at CERN, synchrotron radiation (SR) presents a significant challenge due to the radiation load on collider magnets and equipment in the tunnel like cables, optical fibers, and electronics. The efficiency of the anticipated photon absorbers in the vacuum chambers depends on the operational beam energy, ranging from 45.6 GeV to 182.5 GeV. Radiation load studies using FLUKA are conducted for the four operation modes to assess the SR impact on various systems and equipment. Particularly at higher energies (120 GeV and 182.5 GeV), the radiation levels in the tunnel environment would likely not be sustainable. The objective is to implement a mitigation strategy that enables the placement of essential components, such as electronics, power converters, and beam instrumentation, in the tunnel, while enduring both instantaneous and long-term radiation effects over multiple years.

### Footnotes

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Europe

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