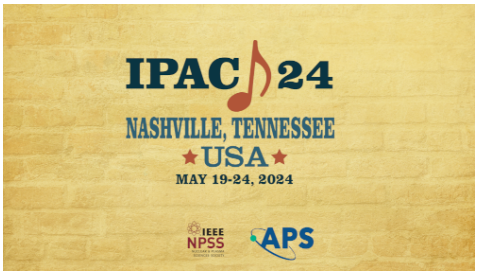

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Energy deposition and radiation level studies for the FCC-ee experimental insertions

Sunday, 19 May 2024 16:00 (2 hours)

The Future Circular Collider (FCC) study foresees the construction of a 90.6 km underground ring where, as a first stage, a high-luminosity electron-positron collider (FCC-ee) is envisaged, operating at beam energies from 45.6 GeV (Z pole) to 182.5 GeV (ttbar). In the FCC-ee experimental interaction regions, various physical processes give rise to particle showers that can be detrimental to machine components as well as equipment in the tunnel, such as cables and electronics. In this work, we evaluate the impact of the synchrotron radiation emitted in the dipoles and the beamstrahlung radiation from the interaction point (IP). The Monte Carlo code FLUKA is used to quantify the power deposited in key machine elements, such as the beamstrahlung dump and the dipole and quadrupole magnets, as well as the cumulative radiation levels in the tunnel. We also examine the effect of synchrotron radiation absorbers in the vacuum chamber, in combination with additional shielding. The results are presented for the different operation modes, namely Z pole and ttbar.

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