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Beamstrahlung dump and radiation levels in the experiment IRs

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The Future Circular Collider (FCC) study explores the feasibility of post-LHC colliders with a circumference of almost 100 km. As a first stage, a high-luminosity electron-positron collider (FCC-ee) is envisaged, with a beam energy ranging from 45.6 GeV (Z pole) to 182.5 GeV (ttbar threshold). The most intense radiation source at FCC-ee interaction region (IR) is the production of synchrotron photons in the field of the counter-rotating beam, called beamstrahlung radiation. Dedicated high-power beam dumps must be designed to safely dispose of the two beamstrahlung photon beams emerging from each interaction point (IP). In this work, the Monte Carlo simulation code FLUKA has been used to give a first evaluation of the main quantities related to the dump core and shielding design. A simple simulation model including only the concrete tunnel, the photon extraction line and the dump, has been set up to assess the power deposition and the DPA in the dump core, as well as the radiation levels induced in its vicinity. This study has been carried out for the two operation modes at Z pole and ttbar threshold and investigating two possible materials for the dump core, graphite and liquid lead.

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