

Monte-Carlo Simulations for the Shielding of FLAIR and other facilities of FAIR

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The Gesellschaft für Schwerionenforschung (GSI) is a heavy ion research facility, which performs basic and applied research in physics and related natural science disciplines. The GSI currently comprises the heavy ion synchrotron SIS 18 which is fed by the linear accelerator UNILAC. With this combination several experimental areas including the fragment separator FRS and the storage ring ESR can be served.

In the next years the GSI will contribute to a new international accelerator facility called FAIR (Facility for Antiproton and Ion Research). The present SIS18 will be used as an injector for a 100/300 Tm double ring heavy ion synchrotron SIS 100/300. This synchrotron will provide intensities of 10^{12} particles per second for uranium beams with energies of 2 GeV per nucleon. Further more with this facility it will be possible to produce antiprotons in a wide energy range. The Facility for Low-energy Antiproton and Ion Research (FLAIR) makes use of the beams of antiprotons and highly-charged ions. It comprises mainly two storage rings (LSR and USR), the universal trap facility HITRAP and five experimental caves.

The shielding of the FLAIR facility and other parts of the FAIR facility will be presented on the basis of several Monte-Carlo simulations for radiation transport with the latest version of the FLUKA code (FLUKA 2005). The production of secondary particles and their transportation through the shielding is calculated to optimize the shape and the thickness of the shielding in order to preserve the limits of the German Radiation Protection Ordinance.