Contribution ID: **33**   Type: **not specified**

Simulation for a target experiment in the PRIMA facility with high intensity electron beams

The PRIMA (Primary-Beam Test Area) facility is located in the R-Weg, the former transport beam line from the DESY II synchrotron to the DORIS storage ring. PRIMA is a high-intensity electron beam facility that has been proposed for testing detectors and devices with much higher particle fluxes than the ones possible at the existing beamlines of the DESY II Test Beam Facility. Also sensor irradiation and fixed-target experiments are possible at this new beamline.

After parasitically extracting electron beams for the DESY II Test Beam Facility by creating Bremsstrahlung and using this to create electrons, the main beam of the DESY II synchrotron is currently dumped during test beam operation. The PRIMA facility upcycles these beams, using them for high-intensity experiments.

Recently, interest rose to create a muon beam for tomography. To carry out fixed target experiments in PRIMA, as for the above example generating muons with a tungsten target, it is also necessary to determine the radiation background from the target during and directly after irradiation and to establish when the radiation emitted by the activated materials falls to a safe level.

FLUKA is a Monte Carlo framework for simulating the interaction and transport of particles in materials including material activation. It is commonly used for studying the radiation background, the properties of shielding materials and particle generation through interactions with the target materials.

Using this simulation tool, the summer student will study the radiation background of the target during and after beam irradiation to investigate how the generated background can be shielded with suitable materials. In addition, thestudent will establish the rate at which the desired particles, typically muons and pions, are produced and how the choice of shielding changes the angular distribution of the created muon and pion beam.

Group

FTX-TBT

Project Category

B2. Development of experimental equipment (hardware-oriented)

Special Qualifications

DESY Site

Hamburg

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