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Simulation of the Bremsstrahlung emission induced by electrons impinging the plasma chamber walls of the ASTERICS ECRIS

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A new electron cyclotron resonance ion source (ECRIS) named ASTERICS is under development for the NEWGAIN project, aiming at building a new injector for the SPIRAL2 accelerator at GANIL. A Monte Carlo code dedicated to the electron dynamics in ECRIS is used to investigate the local energy, position and velocity distribution of electrons impinging on the plasma chamber wall of ASTERICS. These quantities are presented for both the injection and extraction planes and the radial chamber wall. Results show that the electron energy distribution function is different on each of these three surfaces and that the electron velocity direction to the walls is deeply anisotropic. This data is next used as an input in a Fluka 3-dimensional model including the ASTERICS ECRIS mechanics, a simplified low energy beam line and the experimental cave in which the ion source will be installed. The x-ray flux characteristics around the source are presented. The shielding thickness and its location are studied to grant the safe passage of personnel around the ECRIS location in the accelerator building.

Footnotes

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Primary author: THUILLIER, Thomas (Laboratoire de Physique Subatomique et de Cosmologie)

Co-authors: CERNUSCHI, Andrea (Laboratoire de Physique Subatomique et de Cosmologie); CHEYMOL, Benjamin (Laboratoire de Physique Subatomique et de Cosmologie); PEAUCELLE, Christophe (Laboratoire de Physique Subatomique et de Cosmologie); SIMON, Damien (Commissariat à l'Energie Atomique); VEZZU, Francis (Laboratoire de Physique Subatomique et de Cosmologie)

Presenter: THUILLIER, Thomas (Laboratoire de Physique Subatomique et de Cosmologie)

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