**X-Ray Emissivity Models as a Tool for Benchmarking Steady-State ECR Plasma Simulations**

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Electron cyclotron resonance (ECR) plasmas are systems where electrons are energised through resonance heating with microwaves and magnetically confined using min-B profiles. They contain cold ions diffused in a cloud of hot and dense electrons that frequently collide with each other and with radiation through collision-radiative (CR) processes, leading to sequential ionisation and excitation of the neutrals to high charge states [1]. Owing to the strong anisotropy and inhomogeneity of the system, simulation models developed for predicting space-resolved properties of plasma constituents are quite complicated [2,3], and benchmarks with suitable experimental data are the only way to assure their correctness. Soft X-ray spectra and fluorescence maps are not only a powerful non-invasive tool to extract density and temperature of warm electrons in ECR plasmas, but also validate simulation models based on them [4,5]. We present here space-resolved X-ray emissivity models developed to generate synthetic bremsstrahlung spectra and fluorescence maps, starting from ECR plasma simulation outputs. The predicted spectra are compared with experimental measurements, and discrepancies thereof are analysed to improve the 3D PIC-MC codes in use. Consequent updates to the simulation toolkits are useful not only for fundamental research into the operation of these ECR ion sources but also for applications making use of magnetised plasmas like the upcoming PANDORA facility [6].

***References***

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