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Scaling of electron energies with microwave frequency in ECR ion source plasmas JONATHAN NOLAND, DANIELA LEITNER, Lawrence Berkeley National Laboratory, Berkeley, CA, JOHN VERBONCOEUR, Department of Nuclear Engineering, University of California, Berkeley, CA, OLLI TARVAINEN, Department of Physics, University of Jyvaskyla, Jyvaskyla, Finland — The presence of high energy electrons cause ECR ion sources to be strong emitters of x-rays. The x-rays present hazards to personnel and can add substantial heat load to the cryostat of modern, superconducting ECR ion sources. Having an understanding of how x-ray energies and intensities scale with microwave frequency will be very important in the design of future, higher frequency ECR ion sources. In this study the effect that microwave heating frequency has on electron energy and x-ray intensity is examined. To explore how the electron energy and x-ray power scale with microwave frequency, x-ray measurements were taken with a semiconductor type x-ray detector on two different ECR ion sources at Lawrence Berkeley National Laboratory. These sources have frequencies of 6.4 GHz and 10-12 GHz/14 GHz. In addition, transient effects such as plasma formation and decay times were measured using diamagnetic loop signals.

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