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**Measurements of X-ray Spectra on an ECR Ion Source**[1] B.P. CLUGGISH, I.N. BOGATU, L. ZHAO, J.-S. KIM, FAR-TECH, Inc., R. PARDO, R. VONDRASEK, R. SCOTT, Argonne National Laboratory — FAR-TECH, Inc. is developing an X-ray spectral diagnostic for monitoring electron cyclotron resonance ion sources (ECRIS). In an ECRIS, electrons trapped in a magnetic mirror are heated to high energy by resonant absorption of microwaves. Measurements of the X-ray Bremsstrahlung spectrum provide important information about the electron distribution function, which plays a key role in ionization and production of highly charged ions. To this end, FAR-TECH, Inc. has measured X-ray emission from the ECR-II device in the ATLAS facility at ANL. Our measurements indicate a significant population of electrons with energies in excess of 100 keV in ECR-II. Furthermore, we find that both the intensity and the shape of the observed spectra are highly correlated with measurements of the charge state distribution (CSD) of ions extracted from the ECR-II plasma. X-ray spectra and corresponding CSD data will be presented, as well as analysis of their dependence on device parameters. The results will be compared to simulations of ECR-II using our Generalized ECRIS Model (GEM).

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