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Studies of Bemsstrahlung and Characteristic X-Ray Lines Using the VENUS ECR

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Though known for their production of high currents of highly-charged ion beams, advanced electron cyclotron resonance (ECR) ion sources like VENUS at Lawrence Berkeley National Laboratory (LBNL) also generate significant numbers of x-rays. The LBNL ECR ion source group has spent many years studying the x-rays emitted from VENUS in order to gain a better understanding of the ECR plasma. Based on the emitted bremsstrahlung continuum, a spectral temperature Ts can be calculated which is a relative indication of the temperature of the plasma electrons. We will present correlations between Ts with respect to parameters such as magnetic fields. In addition to the bremsstrahlung continuum, the plasma ions emit characteristic x-rays. We will show that additional information can be gained by investigating spectral line shifts. A summary of this recent research using VENUS will be presented and discussed.

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