

Laboratory Astrophysics at the LLNL Electron Beam Ion Traps EBIT-I and EBIT-II

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In order to provide a complete, accurate set of atomic data for interpreting spectra provided by *XMM-Newton*, the *Chandra X-Ray Observatory*, and *Astro-E2*, and to test the accuracy of spectral modeling packages already in use, we have developed an extensive Laboratory Astrophysics program at the LLNL electron beam ion traps EBIT-I and EBIT-II. Over the last decade we have developed the ability to reproduce and isolate the radiative processes that occur in a variety of astrophysical plasmas, such as plasmas in coronal equilibrium found in stellar coronae, ionizing plasmas found in supernova remnants, and recombining plasmas found near accretion sources. In support of this work we have built a suite of spectrometers that measure radiation spanning the 1–7000 Å wavelength band, the most recent addition being the spare NASA/GSFC Astro-E 6x6 microcalorimeter array [1]. An overview of some of the results of our measurements of Fe L-shell line emission will be presented, including excitation cross sections as a function of impact electron energy and contributions from dielectronic recombination [2], absolute excitation cross sections [3], transition wavelengths [4], and relative line intensities measured under non-equilibrium conditions.

References:

- [1] F. S. Porter *et al.* 2000 in Proceedings of the 45th annual SPIE meeting on Optical Science and Technology, 2000.
- [2] M. F. Gu *et al.* *ApJ* **563** 462–471 (2001).
- [3] H. Chen *et al.* *ApJ* submitted (2002).
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