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## 12.11 Using L-shell X-ray Spectra to Determine Conditions of Non-LTE Plasmas

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K-shell x-ray spectra of Li- to H-like ions have long been used to determine plasma conditions. The ratio of integrated line intensities is used to determine the temperature. At the density of Non-LTE plasmas (ne  $^{1021}$ ) the K-shell spectrum is not very sensitive to density. We propose using the L-shell emission of open L-shell ions (C- to Li-like) as an alternative to determine both temperature and density of NLTE plasmas. First, the L-shell models of a mid-Z material need to be verified against the temperatures obtained using a K-shell spectrum of a low-Z material. A buried layer platform is being developed at the OMEGA laser to study the open L-shell spectra of Non-LTE plasmas of mid-Z materials. Studies have been done using a 250 µm diameter dot composed of a layer of 1200 Å thick Zn between two 600 Å thick layers of Ti, in the center of a 1000 µm diameter, 13 µm thick beryllium tamper. Lasers heat the target from both sides for up to 3 ns. The size of the emitting volume vs time was measured with x-ray imaging (face-on and side-on) to determine density. The temperature was measured from the Ti K-shell spectra. The use of this platform for the verification of atomic L-shell models is discussed.

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