

FLYCHK At NIST : The Population Kinetics Modeling Capability

Hyun-Kyung Chung¹, Mau H. Chen¹, Yuri Ralchenko², Richard W. Lee¹

¹ LLNL, L-399 PO Box 808, Livermore, CA 94551

² NIST, 100 Bureau Dr. Stop 8422 Gaithersburg MD 20899

Abstract. Plasma spectroscopy plays an important role in the diagnosis and design of laboratory plasma experiments. With the development of novel plasmas, which access physical regimes in extreme conditions, a general plasma modeling capability is required. This capability is needed to assist in design and analysis of spectroscopic data for a wider range of plasma conditions than previously considered. As a response we have developed FLYCHK [H.-K. Chung, M. H. Chen, W L Morgan, Y. Ralchenko and R. W. Lee, HEDP **1**, 3 (2005)] which is a simple, generalized, non-LTE population kinetics and spectrum generator that provides charge state distributions and synthetic spectra. FLYCHK has been benchmarked against experiments and other kinetics codes and found to provide charge state distributions comparable with both measurements and calculations for most laboratory conditions. At present, an initial version of FLYCHK is implemented at NIST making it widely available to the community with a simple, easy-to-use, fast, and portable interface. Currently, we have 55 users from 14 countries who apply FLYCHK in the area of plasma spectroscopy. We present benchmarked results of FLYCHK, the current status of the code implementation at NIST, and plans for future developments.

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