

## **NIST Numerical Databases for Atomic and Plasma Physics**

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### *Domain : Other*

The Physical Reference Data program [1] at the National Institute of Standards and Technology (NIST) supports about 20 numerical and bibliographic databases of importance for atomic and molecular physics. Here we report on a number of newly developed or recently updated numerical databases for atomic and plasma physics. In July 2006 the most comprehensive of our atomic databases, the NIST Atomic Spectra Database (ASD), was upgraded to version 3.1 [2]. The total number of energy levels and spectral lines is about 76,600 and 141,000, respectively. Transition probabilities are available for about 74,000 spectral lines. The recently added data include extensive data for Be II, Ne II, Ne III, Ne VIII, and all ionization stages of Kr. A large number of spectral lines and transition probabilities was added for Al VI-XII and Si I-XIV. A number of corrections for configurations of complex ions were made as well, including level compositions in Ho and Yb ions and term grouping in rare earth elements. Among other modifications in ASD 3.1 is addition of the bibliographic reference for the primary source of data.

In May 2006 we released a new SAHA Plasma Population Kinetics Modeling Database [3] which contains the benchmark results for simulation of plasma population kinetics and emission spectra. The data calculated by 14 different codes were contributed by the participants of the 3rd Non-LTE Code Comparison Workshop [4]. The list of the available physical parameters includes, for example, mean ion charges, central momenta, ionization distributions, and rates of physical processes. A newly developed user interface allows one to easily perform selection and retrieval of data. The results can be visualized by using a graphical interface which also allows data presentation in different formats.

[1] URL <http://physics.nist.gov/PhysRefData/>.

[2] URL <http://physics.nist.gov/PhysRefData/ASD>.

[3] URL <http://nlte.nist.gov/SAHA/>.

[4] Yu. Ralchenko, R. W. Lee, and C. Bowen, Review of the Third Non-LTE Code Comparison Workshop, Atomic Processes in Plasmas: 14th APS Topical Conference on Atomic Processes in Plasmas, AIP Conference Proceedings 730, 151-160 (2004).