Atomic Spectra Database

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Version 1 of this database is accessible at the NIST Physics Laboratory Web site (physics.nist.gov, select Physical Reference Data). It has data on atomic energy levels for some 500 spectra, transition probability data for spectra of the iron-group elements, and wavelength data for spectra of a few elements. This current version includes no data for one or more of these three types of data for many important spectra, however.

Pending new critical compilations of the most needed data, we have extended the database by editing and adding data from earlier NIST compilations, selected non-NIST compilations, and selected recent publications or unpublished material. The new Version 2.0 ("ASD"), which will be put on-line this year, includes data for observed transitions of 99 elements and energy levels of 52 elements. It contains data on 950 spectra, with 70,000 energy levels and 90,000 lines from 1 Å to 200 μm, about 40,000 of which have transition probabilities.

The two principal categories of queries handled by ASD are for data on energy levels and for data on spectral lines. All current NIST-evaluated data associated with each transition are combined under a single listing. The presentation of the data is much improved and many options, search criteria, and a "Help" file are provided.

ASD has additional energy level data for 12 elements in the range Z=1 to 36 taken largely from material compiled by R. L. Kelly. Additional transition probability data include new NIST compilations for the C, N, and O spectra and data from other, mostly earlier, NIST compilations. ASD thus has energy level data for most spectra of H through Kr (Z=1−36), Mo (Z=42), and for 65 spectra of the rare-earth elements La through Lu (Z=57−71). Wavelengths of observed transitions are included for 99 elements. Energy-level classifications and transition probabilities are included for the lines of most spectra of H through Ni (Z=1−28). Comprehensive lists of observed wavelengths with classifications based on critically compiled level data are available for some elements, including all spectra of Mg, Al, S, and Sc. At a minimum, wavelengths with relative intensities are included for prominent lines of up to the first five spectra of Cu through Es (Z=29−99), with selected transition probabilities for the first two spectra. Several extensive data sets from recent NIST compilations are being prepared for inclusion in a later version of ASD.

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