

CREATION OF DATABASE FOR STARK BROADENING PARAMETERS AT BELGRADE ASTRONOMICAL OBSERVATORY

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The interest for a very extensive list of line broadening data is additionally stimulated by the development of space astronomy where an extensive amount of spectroscopic information over large spectral regions of all kind of celestial objects has been and will be collected, stimulating the spectral-line-shape research. Consequently, the interest not only for abundant, but also for trace elements data increases. Not only in astrophysics, but also in physics and plasma technology, a number of problems depend on very extensive list of elements and line transitions with their atomic and line broadening parameters. One may mention as examples laboratory plasma diagnostic, research and modeling, radiative transfer calculations and investigation of laser produced plasmas (not only in laboratory but as well in industry during the laser welding, melting and evaporation of different targets), and plasma created in fusion research (particularly inertial confinement and pellet compression fusion), development and modeling of lasers, as well as of light sources.

Because of the extensive observations of spectral line shapes of celestial objects, especially in observational astrophysics by satellites, a large number of various spectral line parameters is needed. In last several decades, scientific community had established various databases of spectral line parameter data. These databases contain huge sets of atomic parameters, and Stark broadening parameter data are also very interesting for such purposes. Because of that, we are creating database at the Astronomical Observatory in Belgrade (BELDATA) which main core of data will be Stark broadening parameters for spectral line widths and shift (Popović et al., 1999, 2000). Stark broadening parameters, are needed in astrophysical research, for calculation of stellar opacities, abundance determination, stellar atmospheres modeling and interpretation and modeling of stellar spectra.

At the Astronomical Observatory Stark broadening parameters for various atoms and ions have been calculated by semiclassical perturbation formalism (Sahal-Bréchet, 1969ab) and by modified semiempirical approach (Dimitrijević and Konjević, 1980, Dimitrijević, 2000). These calculations will be included in our database. User can access to Stark widths and shifts for particular element, transition, electron density and temperature. After accessing database user will

firstly fill query for needed data. Database Manager System will process his query and after searching data he will receive needed information. For convenience BELDATA is connected on Internet. Communication between Internet and server that holds database, automatic manipulation of database data and other integration of database and Internet are made by standard tools and applications. BELDATA maintainers will try to follow philosophy of user-friendly approach so database user will have full convenience. New data in database will be added as soon as possible and whole database software will be updated following new trends in developing of database tools. Collaboration with other Internet database sites is established, e.g. Vienna Atomic Line Database (Kupka et al., 1999), and covers technical support and Internet mirroring.

Besides Stark broadening parameters, BELDATA will hold all of papers, articles and abstracts concerning Stark broadening calculations and applications made at the Astronomical Observatory and most important theoretical and observational works made by other researchers in Portable Document format (PDF) and/or PostScript (PS) format.

We have plans to expand database to other research fields that are in progress at the Astronomical Observatory. This includes spectra of active galactic nuclei (AGN) investigations. As a part of Astronomical Observatory bibliographic system, BELDATA will include contents and abstracts of Serbian Astronomical Journal and Publications of the Astronomical Observatory of Belgrade.

References:

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