

**DATABASE BelData: PRESENT STATE  
AND PLANS FOR FUTURE DEVELOPMENT**

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**Abstract.** The current status of the project of the realization of the database BelData is described.

## 1. INTRODUCTION

For a number of problems in astronomy and physics, a large number of different data is needed, so that the arrangement of such data in databases is obviously of great interest. Problems where such databases are particularly important, are for example modelling of different plasmas, spectra synthesis and radiative transfer calculations. Particularly large number of data is needed for analysis of stellar spectra, since the atmospheric composition of a star is not known *a priori*, and many interesting groups of stars exist with very peculiar abundances as compared to the Sun. Consequently, stellar spectroscopy depends on very extensive list of elements and line transitions with their atomic and line broadening parameters.

The interest for a very extensive list of atomic, collisional and 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. Development of computers and special softwares (as e.g. SYNTH, CLODLY, etc.) also stimulated the need for a large amount of atomic, spectroscopic, and other data needed for modelling and investigations of different laboratory and astrophysical plasmas.

There are several approaches to collect the useful data which might be systematized in databases.

a) First of all one can collect the references or the references with citations, which may be published as a book but also organized as a database, as e.g. Science Citation Index, Astrophysical Data System - ADS, etc.

b) Data collections from literature or other sources.

c) Critically evaluated set of data is particularly useful as for example critically evaluated Stark broadening data published by Nikola Konjević and his co-workers (Konjević and Roberts 1976, Konjević and Wiese 1976, 1990, Konjević *et al.* 1984ab, 2002). When compiled data are presented, a useful information is also the data source with authors.

d) In astronomy, a large amount of observational data is published in different stellar catalogues. Such catalogues are published in Belgrade Astronomical Observatory by Sofija Sadžakov, Miodrag Dačić, Zorica Cvetković, Georgije Popović... (Sadžakov and Saletić 1972, 1975, Popović 1974, Sadžakov 1978, Sadžakov *et al.* 1981, 1991, 1992, 1996, 1997, Sadžakov and Dačić 1989, 1990, Mijatov *et al.* 1991, Cvetković 1992) and our intention is to organize them in the future as a database.

e) On Belgrade Astronomical Observatory and other old observatories, a large amount of photographic plaques with observational data are stored. An international effort is to digitalize such data and arrange them as databases available to the international scientific community.

f) Journals and publications may also be put in a database, enabling a search through key words.

g) In order to complete as much as possible Stark broadening data needed for astrophysical and laboratory plasma research and stellar opacities calculations Milan S. Dimitrijević, Luka Č. Popović, Vladimir Kršljanin, Dragana Tankosić, Nenad Milovanović, Zoran Simić, Zorica Cvetković, Miodrag Dačić and Predrag Jovanović are making and will make a continuous effort to provide Stark broadening data for a large set of atoms and ions.

The project of the realization of the database BelData includes creation and development of the database for: a) Stark broadening parameters obtained mainly by the fellows of the Group of Astrophysical spectroscopy and their co-workers; b) spectra of active galaxies, observed or reduced by the AOB staff; c) stellar catalogues observed and composed in Belgrade; d) abstracts of papers (and later complete papers) appeared in publications of the Belgrade Astronomical Observatory.

The first phase of the design and elaboration of the astronomical database BelData is completed. Database serving as the web interface support has been designed and completed, as well as the web interface for data access and the corresponding search. Also designed and elaborated is database for Stark broadening parameters (line widths and shifts) obtained by using semiclassical perturbation formalism. Currently the database contains catalogues of data for Be I, Sr I, Be III, B III, O IV, P IV, C V, O V, P V, S V, Ne VIII, Ca IX, Ca X, Al XI, Si XI, Si XII, Si XIII. Relational databases have been realized by using MySQL server. Web interface has been realized in PHP, Java Script and HTML.

In Fig. 1 is shown the opening page of the database with list of catalogues and search conditions. We show here as an example, the search for Stark broadening data for a part of the optical spectral region ( $5000 \text{ \AA} \pm 700 \text{ \AA}$  and a temperature of  $T = 100\,000 \text{ K}$ , typical for PG1159 type stars. In Fig. 2, the result of the query is shown.

The internet address of the "BelData" database is <http://quasar.aob.bg.ac.yu>. This is the first database in astronomy, completely realised in Serbia.

We developed also a collaboration with the following databases:

a) Astrophysical Data System (<http://adswwww.harvard.edu/BOBeo>) where Ser-

Belgrade Astronomical Observatory - Mozilla

File Edit View Search Go Bookmarks Tasks Help

Back Forward Reload <http://ao.b.aob.bg.ac.yu/> Search

Home Bookmarks Web Mail Calendar Radio People Yellow Pages Download Customize...

Print

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**Welcome to Beldata Astronomical Database**

**Search conditions**

Wavelength +/- 700  
 cm-3 per turbler density  
 Transition  
 100000  
 Temperature

Search selected catalogues:  
 Currently available catalogues:  
 Selected all  Clear

- JJA+AS/I05/E245 Stark broadening Al XI and Si XII (Dimitrievic+ 1994)
- JJA+AS/I05/E243 Stark broadening of Be lines (Dimitrievic+ 1994)
- JJA+AS/I19/G889 Stark broadening XIV, Be III and B III (Dimitrievic+, 1996)
- JJA+AS/I07/J949 Stark broadening X (Dimitrievic+, 1994)
- JJA+AS/I09/G51 Stark broadening XII, DIV & DV (Dimitrievic+, 1995)
- JJA+AS/I15/G51 Stark broadening XIII, C V and P V (Dimitrievic+, 1996)
- JJA+AS/I19/G29 Stark broadening : Sr I (Dimitrievic+, 1996)
- JJA+AS/I22/E533 Stark broadening of P IV spectral lines (Dimitrievic+ 1997)
- JJA+AS/I27/E43 Stark broadening of S V lines (Dimitrievic+ 1998)
- JJA+AS/I26/G59 Stark broadening of Ca IX and Ca X lines (Dimitrievic+ 1998)
- JJA+AS/I29/I55 Si XI & Si XIII lines Stark broadening (Dimitrievic+ 1998)

12:08 Tuesday, 15 October 2002  
 Author Vladimir Balcefa

Document: Done (0.138 secs)

Figure 1: BelData search form.

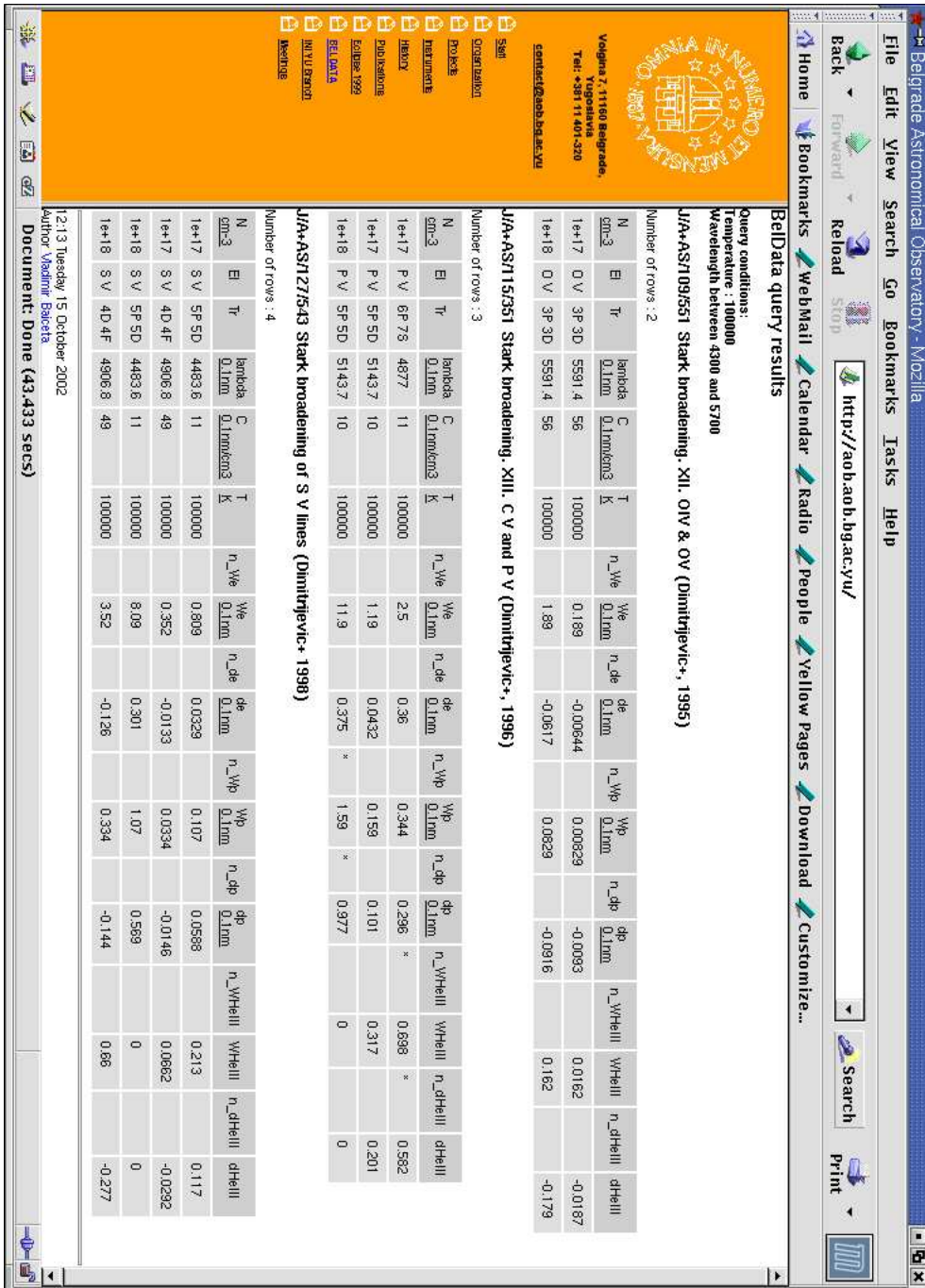


Figure 2: Query results.

bian Astronomical Journal is available.

b) VALD2 database of Vienna Observatory. Prof. Werner Weiss rendered help in education on database creation for Nenad Milovanović. We coordinate database organization so that the two bases will be complementary.

c) Wide Field Photographic Observations Database (WFPDB, <http://skyarchive.org>), established in Sofia by Milcho Tsvetkov and his co-workers. An agreement on cooperation in digitalization and organization in a database of old photographic plates at Belgrade Astronomical Observatory is being prepared.

d) Database of the Institute of Astronomy of Russian Academy of Science in Moscow (<http://www.inasan.rssi.ru>) supervised by Olga Dluhnevskaya.

All the mentioned work on development of BelData progresses slowly owing to financial difficulties. We hope that its development will be useful for the scientific community.

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