

**XII SERBIAN CONFERENCE
ON SPECTRAL LINE SHAPES IN ASTROPHYSICS**

BOOK OF ABSTRACTS

**Eds. Dragana Ilić, Evgeny Stambulchik,
Andjelka Kovačević and Luka Č. Popović**



Faculty of Mathematics, University of Belgrade

2019

XII SERBIAN CONFERENCE ON SPECTRAL LINE SHAPES IN ASTROPHYSICS

June 3 – 7, 2019, Vrdnik, Serbia

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**BELGRADE NODES OF VAMDC: DATABASES FOR ATOMIC AND
MOLECULAR COLLISIONAL AND RADIATIVE PROCESSES
NEEDED FOR SPECTROSCOPY**

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Spectroscopy has been crucial for understanding astrophysical phenomena. The interpretation of line spectra with radiative transfer calculations usually requires two kinds of atomic input data such as spectroscopic data (energy levels, statistical weights, transition probabilities, etc.) and collisional data. The major advance in the data access in the last decade is an advent of Virtual Atomic and Molecular Data Center (VAMDC). In this contribution we present a report on two atomic/molecular databases for collisional and radiative processes, BEAMDB and MolD, which are web services at the Serbian Virtual Observatory (SerVO) and nodes within the Virtual Atomic and Molecular Data Center (VAMDC). Within the BEAMDB there are mainly electron scattering cross section data, but having in mind the importance of spectroscopic data obtained by particle collisions, we also provide a number of electron energy loss spectra and threshold electron spectra. Electron loss spectroscopy with its complementarity to the photon absorption data, provides valuable information on the optically forbidden atomic and molecular transitions. The MolD database contains photodissociation cross sections for the individual rovibrational states of the diatomic molecular ions as well as corresponding data on molecular species and molecular state characterizations (rovibrational energy states, etc.). These cross sections can be used for further applications, e.g., obtaining rate coefficients for non-local thermal equilibrium models of early universe chemistry, models of the solar atmosphere, atmospheres of white dwarfs, etc. Also, in this contribution we summarize challenges of atomic/molecular databases and share our experiences.

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