Russian Federal Nuclear Center- All-Russian Institute of Technical Physics

Partner contact person : P.A. Loboda

Russian Federal Nuclear Centre All-Russian Institute of Technical Physics (RFNC VNIITF) is a multidisciplinary national scientific centre of the Russian Federation running research and development programs in the domain of high-energy-density physics (HEDP) and related fields of physics, computer science, material science, and technology. Appropriate modeling of EUV and x-ray emission and absorption spectra of matter under extreme conditions of hot laboratory and astrophysical plasmas is an inherent feature of the HEDP research and, in turn, implies realistic description of atomic-structure and spectral properties of various multielectron ions. The latter activities are being run at the institute for more than two decades and involve spectroscopic-data calculations for multielectron ions and elaboration of atomic

databases; development of theoretical models to calculate detailed Stark-broadened lineshapes; and development of theoretical models to calculate opacities of the multielectron-ion plasmas utilizing both the detailed and statistically averaged description of the bound-bound and bound-free transitions. The spectroscopic constituent of the effort, in particular, resulted in the creation of the
Spectr-W
3
information-reference system (
http://spectr-w3.snz.ru
) providing free round-the-clock access to the Spectr-W
3
factual atomic database and presenting experimental, calculated, and compiled data on ionization potentials, energy levels, wavelengths, radiation transition probabilities and oscillator strengths, and also parameters of analytical approximations of electron-collisional cross-sections and rates for atoms and ions. The Spectr-W
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project is being implemented
under the long-term collaboration with the high-level experts of
the Joint Institute for High Temperatures of Russian Academy of Sciences (JIHT RAS) and partial support of International Science and Technology Centre (ISTC,
www.istc.ru
). To date, Spectr-W
3
atomic database is still the largest factual database in the world, containing the information on spectral properties of multicharged ions (about 450,000 records).

Key persons :

P.A. Loboda, Dr. of Science, Principal scientist.

Expertise : atomic physics, lineshape theory, and spectroscopy of hot dense plasmas. Leader of the Spectr-W ^{3} project.

Role in VAMDC project : connection to the users of the Spectr-W^{3} database, testing and calculation of atomic data, development of algorithms for interfaces to represent the Spectr-W ^{3} data in line with the common VAMDC standards for data inquiry and output, interoperability and publication tools. SAs, JRA1, JRA2.

I.Yu. Skobelev, Dr. of Science, Leading scientist.

Expertise : atomic physics, spectroscopy of hot dense plasmas.

Role in VAMDC project : data assessment, quality assurance, testing and calculation of atomic data, interoperability issues. SA1, JRA1.

S.V. Gagarin, Head of laboratory.

Expertise : multidisciplinary computer science.

Role in VAMDC project : Development of XML schemas and user-interface utilities to represent the Spectr-W ^{3} data in line with the common VAMDC standards, interoperability, publication, new mining and integration tools. SA1, JRAs.

S.V. Morozov, workgroup leader.

Expertise: database developments and programming.

Role in VAMDC project : Development of the user-interface utilities, Spectr-W^3 database maintenance and upgrade. SA2, JRA2, JRA3.

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