



Eighth International Conference on Atomic and Molecular Data and Their Applications

ICAMDATA-2012

Gaithersburg, Maryland, USA

30 September – 4 October 2012

Editors

John D. Gillaspy

Wolfgang L. Wiese

Yuri A. Podpaly

NIST, Gaithersburg, Maryland, USA



Melville, New York, 2013
AIP Proceedings

Volume 1545

To learn more about AIP Proceedings visit <http://proceedings.aip.org>

Editors

John D. Gillaspy

Wolfgang L. Wiese

Yuri A. Podpaly

NIST

Atomic Spectroscopy Group

100 Bureau Drive, Mailstop 8422

Gaithersburg, MD 20899-8422

USA

E-mail: john.gillaspy@nist.gov

wolfgang214@msn.com

yuri.podpaly@nist.gov

Authorization to photocopy items for internal or personal use, beyond the free copying permitted under the 1978 U.S. Copyright Law (see statement below), is granted by the AIP Publishing LLC for users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee of \$30.00 per copy is paid directly to CCC, 222 Rosewood Drive, Danvers, MA 01923, USA: <http://www.copyright.com>. For those organizations that have been granted a photocopy license by CCC, a separate system of payment has been arranged. The fee code for users of the Transactional Reporting Services is: 978-0-7354-1170-8/13/\$30.00



© 2013 AIP Publishing LLC

No claim is made to original U.S. Government works.

Permission is granted to quote from the AIP Conference Proceedings with the customary acknowledgment of the source. Republication of an article or portions thereof (e.g., extensive excerpts, figures, tables, etc.) in original form or in translation, as well as other types of reuse (e.g., in course packs) require formal permission from AIP Publishing and may be subject to fees. As a courtesy, the author of the original proceedings article should be informed of any request for republication/reuse. Permission may be obtained online using RightsLink. Locate the article online at <http://proceedings.aip.org>, then simply click on the RightsLink icon/"Permissions/Reprints" link found in the article abstract. You may also address requests to: AIP Publishing Office of Rights and Permissions, Suite 1N01, 2 Huntington Quadrangle, Melville, NY 11747-4502, USA; Fax: 516-576-2450; Tel.: 516-576-2268; E-mail: rights@aip.org.

ISBN 978-0-7354-1170-8 (Original Print)

ISSN 0094-243X

Printed in the United States of America

AIP Conference Proceedings, Volume 1545
**Eighth International Conference on Atomic and Molecular Data
and Their Applications**
ICAMDATA-2012

Table of Contents

**Preface: Eighth International Conference on Atomic Data and Their
Applications (ICAMDATA-2012)**

Wolfgang L. Wiese, John D. Gillaspy, and Yuri A. Podpaly 1

ICAMDATA 2012 Group Photograph 3

International Program Committee and Local Conference Committee 4

Meetings in This Series and the Proceedings 5

ATOMIC DATA PRODUCTION

**Storage-ring measurements of hyperfine induced transition rates in
berylliumlike ions**

Stefan Schippers 7

Light element opacities of astrophysical interest from ATOMIC

J. Colgan, D. P. Kilcrease, N. H. Magee Jr., G. S. J. Armstrong,
J. Abdallah Jr., M. E. Sherrill, C. J. Fontes, H. L. Zhang, and P. Hakel 17

Atomic data for iron-group elements of astrophysical interest

Gillian Nave, Craig J. Sansonetti, Juliet C. Pickering, Matthew Ruffoni,
Anne P. Thorne, and Florence Liggins 27

**High precision atomic data as a measurement tool for halo nuclei:
Theory**

G. W. F. Drake and Zong-Chao Yan 32

High precision atomic data for halo nuclei and related nuclear structure

Wilfried Nörtershäuser 52

EBIT spectroscopy of highly charged heavy ions relevant to hot plasmas Nobuyuki Nakamura, Xiao-Bin Ding, Chen-Zhong Dong, Hirohisa Hara, Daiji Kato, Fumihiro Koike, Izumi Murakami, Tomohide Nakano, Hayato Ohashi, Hiroyuki A. Sakaue, Hirofumi Watanabe, Tetsuya Watanabe, and Norimasa Yamamoto	62
--	----

Cross-section measurements with interacting beams R. A. Phaneuf, A. L. D. Kilcoyne, A. Müller, S. Schippers, N. Aryal, K. Baral, J. Hellhund, A. Aguilar, D. A. Esteves-Macaluso, and R. Lomsadze	72
---	----

MOLECULAR PROCESSES AND DATA ACTIVITIES

Renaissance in diatomic spectroscopy Eberhard Tiemann and Horst Knöckel	79
The CDMS view on molecular data needs of <i>Herschel</i>, SOFIA, and ALMA Holger S. P. Müller, C. P. Endres, J. Stutzki, and S. Schlemmer	96
Storage ring experiments on electron–molecular-ion interactions Andreas Wolf	110
Data for modeling of positron collisions and transport in gases Z. Lj. Petrović, A. Banković, S. Dujko, S. Marjanović, G. Malović, J. P. Sullivan, and S. J. Buckman	115

DATA NEEDS FOR FUSION

The extreme ultraviolet emissions of $W^{23+}(4f^5)$ T Pütterich, V. Jonauskas, R. Neu, R. Dux, and ASDEX Upgrade Team	132
A study of tungsten spectra using large helical device and compact electron beam ion trap in NIFS S. Morita, C. F. Dong, M. Goto, D. Kato, I. Murakami, H. A. Sakaue, M. Hasuo, F. Koike, N. Nakamura, T. Oishi, A. Sasaki, and E. H. Wang	143
Atomic data for beam-stimulated plasma spectroscopy in fusion plasmas O. Marchuk, Yu. Ralchenko, D. R. Schultz, W. Biel, T. Schlummer, and TEXTOR-Team	153

DATA NEEDS FOR ASTROPHYSICS

Data needs for X-ray astronomy satellites T. Kallman	164
Spectral modeling and diagnostics in various astrophysical environments Jelle S. Kaastra	176
Laboratory studies of primordial chemistry and implications for first star formation Daniel Wolf Savin	185
Data structures for ExoMol: Molecular line lists for exoplanet and other atmospheres Jonathan Tennyson, Christian Hill, and Sergei N. Yurchenko	186
Charge exchange spectroscopy of multiply charged ions of industrial and astrophysical interest Hajime Tanuma	196

DATA NEEDS FOR INDUSTRY

Data of heavy elements for light sources in EUV and XUV and for other applications F. Koike, H. Funaba, M. Goto, D. Kato, T. Kato, S. Morita, I. Murakami, H. A. Sakaue, S. Sudo, C. Suzuki, N. Tanuma, A. Sasaki, and X. B. Ding	202
Data needs for low temperature plasmas and accelerator applications Igor Kaganovich	212
Chemically reactive species in liquids generated by atmospheric-pressure plasmas and their roles in plasma medicine Satoshi Hamaguchi	214

DATABASES AND RELATED COMPUTATIONS

The HITRAN molecular database Laurence S. Rothman and Iouli E. Gordon	223
---	-----

Charge transfer cross section calculation and evaluation for Be^{q+}+H collisions	
C. H. Liu, L. Liu, Y. Z. Qu, J. G. Wang, and R. K. Janev	232
The propagation of uncertainties in atomic data through collisional-radiative models	
Stuart Loch, Mitch Pindzola, Connor Ballance, Mike Witthoeft, Adam Foster, Randall Smith, and Martin O'Mullane	242
AtomDB: Atomic data for X-ray astronomy	
Adam R. Foster, Li Ji, Hiroya Yamaguchi, Randall K. Smith, and Nancy S. Brickhouse	252
Coordinated activities on evaluation of collisional data for fusion applications	
H.-K. Chung and B. J. Braams	260
 TRIBUTE TO THE LIFETIME WORK OF NIST PHYSICISTS CHARLOTTE FROESE FISCHER AND JOE READER	
Accurate transition probabilities from large-scale multiconfiguration calculations - A tribute to Charlotte Froese Fischer	
Per Jönsson, Michel Godefroid, Gediminas Gaigalas, Jacek Bieroń, and Tomas Brage	266
Laboratory spectroscopy and space astrophysics: A tribute to Joe Reader	
David S. Leckrone	279
Author Index	289
Poster List	293
Conference Schedule	297
Attendees List	303