

# CURRICULUM VITAE

## Daniel Wolf Savin

Columbia Astrophysics Laboratory

Mail Code 5247

550 West 120<sup>th</sup> Street

New York, NY 10027

Phone: 1-212-854-4124

Fax: 1-212-854-8121

e-mail: [savin@astro.columbia.edu](mailto:savin@astro.columbia.edu)

<http://www.astro.columbia.edu/~savin>

## Education

1994 Ph.D., Harvard University.

1987 M.A., Harvard University.

1985 B.A., Columbia University, (Magna Cum Laude).

## Employment History

01/2009–05/2009 Columbia University, Adjunct Professor of Astronomy.  
07/2006–present Columbia Astrophysics Laboratory, Senior Research Scientist.  
12/2002–12/2003 Weizmann Institute of Science, Visiting Scientist.  
07/2000–06/2006 Columbia Astrophysics Laboratory, Research Scientist.  
09/1996–06/2000 Columbia Astrophysics Laboratory, Associate Research Scientist.  
03/1994–08/1996 University of California at Berkeley, Post-Graduate Research Physicist.  
06/1986–02/1994 Harvard University, Research Assistant.  
09/1985–05/1986 Harvard University, Teaching Fellow.

## Professional Societies

American Astronomical Society.

American Physical Society.

International Astronomical Union.

Phi Beta Kappa.

## Academic Awards

2006 Fellow, American Physical Society.

1985 Phi Beta Kappa.

1985 Sigma Pi Sigma, Columbia University.

## I. Research Experience

### Current Grants as PI

*Laboratory Measurements of Electron Impact Ionization in Support of the NASA Heliophysics Research Program*

Agency: National Aeronautics and Space Administration

Division: Heliophysics

Program: Solar & Heliospheric Physics Supporting Research and Analysis

Effective: January 2012 - December 2014

*Laboratory Studies of Halogen Chemistry in Interstellar Clouds in Support of the NASA Astrophysics Research Program*

Agency: National Aeronautics and Space Administration

Division: Astrophysics

Program: Astronomy and Astrophysics Research and Analysis

Effective: November 2011 - October 2013

*Improving Models of Molecular Clouds and Planetary Atmospheres: Dissociative Recombination Measurements for Molecular Ions of Astronomical Interest*

Agency: National Science Foundation

Division: Astronomical Sciences

Program: Galactic Astronomy

Effective: July 2011 - June 2014

*SHINE: Observationally Constraining the Physical Processes that Generate the Solar Wind*

Agency: National Science Foundation

Division: Atmospheric and Geospace Sciences

Program: Solar-Terrestrial

Effective: April 2011 - March 2014

*Development of a Novel Instrument to Study the Cosmic Origins of Organic Chemistry and the Cosmo-Chemical Pathway towards Life*

Agency: National Science Foundation

Division: Astronomical Sciences

Program: Advanced Technologies and Instrumentation

Effective: September 2009 - August 2012

*Further Measurements of Low Temperature Dielectronic Recombination Rate Coefficients for Photoionized Cosmic Plasmas*

Agency: National Aeronautics and Space Administration

Division: Astrophysics

Program: Astronomy and Astrophysics Research and Analysis

Effective: April 2009 - March 2013

*Laboratory Measurements of Dielectronic Recombination and Electron Impact Ionization in Support of NASA's Heliosphysics Research Program*

Agency: National Aeronautics and Space Administration

Division: Heliophysics

Program: Solar & Heliospheric Physics Supporting Research and Analysis

Effective: January 2009 - December 2012

## Completed Grants as PI

*Improved Understanding of Molecular Clouds and Emission Line Objects with Laboratory Astrophysics Studies at the Heidelberg Ion Storage Ring*

Agency: National Science Foundation

Division: Astronomical Sciences

Program: Galactic Astronomy

Effective: July 2008 - June 2011

*Low Temperature Dielectronic Recombination Rates for Photoionized Cosmic Plasmas*

Agency: National Aeronautics and Space Administration

Division: Astrophysics

Program: Astronomy and Physics Research and Analysis

Effective: April 2006 - March 2010

*Further Measurements of High Temperature Dielectronic Recombination Rate Coefficients in Support of NASA's Sun-Earth Connection Program*

Agency: National Aeronautics and Space Administration

Division: Heliophysics

Program: Solar & Heliospheric Physics Supporting Research and Analysis

Effective: February 2006 - January 2010

*Improved Simulations of Cosmic Plasmas: Measurements and Modeling Thermal Energy Charge Transfer*

Agency: National Science Foundation

Division: Astronomical Sciences

Program: Stellar Astronomy and Astrophysics

Effective: August 2006 - July 2009

*Development of a Novel Laboratory Instrument for Studying Gas-Phase Negative Ion Chemistry*

Agency: National Science Foundation

Division: Chemistry

Program: Chemical Instrumentation

Effective: September 2005 - August 2009

*Sensitivity of Modeling Cosmic Plasmas to Uncertainties in Atomic and Molecular Physics*

Agency: National Aeronautics and Space Administration

Division: Astrophysics

Program: Astrophysics Theory Program

Effective: June 2004 - May 2005

*Improved Simulations of Cosmic Plasmas: Measurements and Modeling Thermal Energy Charge Transfer*

Agency: National Science Foundation

Division: Astronomical Sciences

Program: Galactic Astronomy

Effective: July 2003 - June 2006

*New Low Temperature Dielectronic Recombination Rates for Modeling Photoionized Cosmic Plasmas*

Agency: National Aeronautics and Space Administration

Division: Astrophysics

Program: Space Astrophysics Research and Analysis

Effective: April 2003 - March 2007

*Measurements of High Temperature Dielectronic Recombination Rate Coefficients in Support of NASA's Sun-Earth Connection Program*

Agency: National Aeronautics and Space Administration

Division: Heliophysics

Program: Solar & Heliospheric Physics Supporting Research and Analysis

Effective: February 2003 - January 2007

*Unraveling the Physical Conditions in the Solar Atmosphere: Experimental and Theoretical Atomic Rates for Ions of Neon and Magnesium*

Agency: National Aeronautics and Space Administration

Division: Heliophysics

Program: Solar Physics Research, Analysis, and Suborbital

Effective: May 2000 - April 2004

*Measurements, Calculations, and Astrophysical Implications of New Low Temperature Dielectronic Recombination Rates for Modeling Photoionized Cosmic Plasmas*

Agency: National Aeronautics and Space Administration

Division: Astrophysics

Program: Space Astrophysics Research and Analysis

Effective: February 2000 - January 2004

*Level 2 Proposal for Participation in the Chandra Emission Line Project*

Agency: National Aeronautics and Space Administration

Divisions: Astrophysics

Program: Chandra Emission Line Project (Level 2)

Effective: October 1999 - November 2000

*Measurement of Dielectronic Recombination for Modeling Astrophysical Plasmas*

Agency: North Atlantic Treaty Organization

Program: International Scientific Exchange Programmes

Effective: October 1998 - October 2001

*Measurement of Dielectronic Recombination for Modeling Astrophysical Plasmas*

Agency: North Atlantic Treaty Organization

Program: International Scientific Exchange Programmes

Effective: October 1995 - September 1998

## Completed Grants as Co-Investigator

*X-Ray Spectroscopic Laboratory Astrophysics Experiments in Support of the NASA X-Ray Astronomy Flight Program* (Prof. Steven M. Kahn, PI)

Agency: National Aeronautics and Space Administration

Division: Astrophysics

Program: High Energy Astrophysics Supporting Research and Technology

Effective: February 1997 - May 2000

*X-Ray Spectroscopic Laboratory Astrophysics Experiments in Support of the NASA X-Ray Astronomy Flight Program* (Prof. Steven M. Kahn, PI)

Agency: National Aeronautics and Space Administration

Division: Astrophysics

Program: High Energy Astrophysics Supporting Research and Technology

Effective: November 1994 - June 1998

## Completed Grants as Collaborator

*Improved Simulations of Astrophysical Plasmas: Computation of New Atomic Data* (Prof. Thomas W. Gorczyca, PI)

Agency: National Aeronautics and Space Administration

Division: Astrophysics

Program: Astronomy and Physics Research and Analysis

Effective: January 2007 - December 2009

*Accurate Treatment of Electron-Ion Recombination Rate Coefficients for Solar Physics* (Prof. Thomas W. Gorczyca, PI)

Agency: National Aeronautics and Space Administration

Division: Heliophysics

Program: Solar & Heliospheric Supporting Research and Analysis

Effective: November 2007 - October 2008

*Calculations of High Temperature Dielectronic Recombination Rate Coefficients in Support of NASA's Sun-Earth Connection Program* (Prof. Thomas W. Gorczyca, PI)

Agency: National Aeronautics and Space Administration

Division: Heliophysics

Program: Solar & Heliospheric Supporting Research and Analysis

Effective: September 2004 - August 2007

*Laboratory Investigations of Early Universe Chemistry* (Prof. Anthony G. Calamai, PI)  
Agency: National Science Foundation  
Division: Astronomical Sciences  
Program: Extragalactic Astronomy and Cosmology  
Effective: June 2004 - May 2007

*Improved Simulations of Astrophysical Plasmas: Computation of New Atomic Data* (Prof. Thomas W. Gorczyca, PI)  
Agency: National Aeronautics and Space Administration  
Division: Astrophysics  
Program: Astronomy and Physics Research and Analysis  
Effective: October 2003 - September 2006

*Measurements of Electron Impact Ionization in Support of NASA's Sun-Earth Connection Program* (Dr. Mark E. Bannister, PI)  
Agency: National Aeronautics and Space Administration  
Division: Heliophysics  
Program: Solar & Heliospheric Physics Supporting Research and Analysis  
Effective: October 2003 - September 2006

*Improved Electron Impact Ionization Data for Modeling Cosmic Plasmas: New Measurements and Theoretical Calculations* (Dr. Mark E. Bannister, PI)  
Agency: National Aeronautics and Space Administration  
Division: Astrophysics  
Program: Astronomy and Physics Research and Analysis  
Effective: November 2003 - October 2006

*Measurements and Astrophysical Implications of Charge Transfer at Thermal Energies* (Dr. Charles C. Havener, PI)  
Agency: National Aeronautics and Space Administration  
Division: Astrophysics  
Program: Space Astrophysics Research and Analysis  
Effective: April 2002 - March 2005

*Improved Simulations of Astrophysical Plasmas: Computation of New Atomic Data* (Prof. Thomas W. Gorczyca, PI)  
Agency: National Aeronautics and Space Administration  
Division: Astrophysics  
Program: Space Astrophysics Research and Analysis  
Effective: March 2001 - February 2004

## II. Teaching Experience

### Invited Conference and Workshop Lectures

- “Molecular Hydrogen Formation in the Early Universe: New Implications from Recent Laboratory Results”, 3rd International Conference on Current Developments in Atomic, Molecular, Optical, and Nano Physics, Dehli, India, Dec. 2011.
- “H<sub>2</sub> Formation in the Early Universe: Modern Day Measurements of Chemistry Long Ago”, Hydrogen Cosmology Workshop, Institute for Theoretical Atomic and Molecular Physics, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, May 2011.
- ”The Genesis Projects: Laboratory Studies in Molecular Astrophysics from the First Stars to the Beginning of Organic Chemistry”, New York Sectional Meeting of the American Physical Society, Hofstra University, Hemstead, NY, Oct. 2010.
- “Experimental Studies in Laboratory Astrophysics from High  $z$  to High  $Z$ ”, Symposium on Laboratory Astrophysics at the Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, Sep. 2010.
- “Molecular Hydrogen Formation in the Early Universe: New Implications from Laboratory Measurements”, Eighth International Conference on Dissociative Recombination: Theory, Experiments & Applications, Lake Tahoe, CA, Aug. 2010.
- “Blowing in the Wind or Storage Ring Studies for AGN and Stellar Winds”, Meeting of the Groupe de Contact Fonds National de la Recherche Scientifique (FNRS): Atomes, Molécules et Radiation, Brussels, Belgium, Oct. 2009.
- “Recombination and Ionization Measurements for Astrophysics,” Symposium on Physics with Cold Stored Ion Beams, Max Planck Institute for Nuclear Physics, Heidelberg, Germany, Jun. 2008.
- “Progress on Laboratory Measurements of H<sub>2</sub> Formation for Early Universe Chemistry,” Workshop on Atomic and Molecular Physics of the Early Universe, Institute for Theoretical Atomic and Molecular Physics, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, Apr. 2008.
- “Laboratory Astrophysics: Summary and Outlook,” Atomic Ion Stage Abundances in Astrophysical Plasmas, South East Laboratory Astrophysics Workshop, Auburn, AL, Feb. 2008.
- “Laboratory Astrophysics at Heavy-Ion Storage Rings,” XXV International Conference on Photonic, Electronic, and Atomic Collisions, Freiberg, Germany, Jul. 2007.
- “Atomic Recombination and Ionization Data Needs Cosmic Plasmas”, 15th APS Topical Conference on Atomic Processes in Plasmas, Gaithersburg, MD, Mar. 2007.
- “Analog and Digital Simulations of Maxwellian Plasmas for Astrophysics,” 20 Years of Spectroscopy with the Electron Beam Ion Trap , Berkeley, CA, Nov. 2006.
- “Cosmology in a Can: Laboratory Studies in Atomic and Molecular Physics from High  $z$  to Low  $Z$ ,” Israeli Physics Society, Karmiel, Israel, Dec. 2005.
- “Dielectronic Recombination,” American Astronomical Society, Minneapolis, MN, Jun. 2005.
- “Laboratory Cosmology,” American Physical Society Division of Atomic, Molecular, and Optical Physics (DAMOP), Lincoln, NE, May 2005.
- “Ionization and Recombination: Laboratory Measurements and Observational Consequences,” X-Ray Diagnostics of Astrophysical Plasmas, Cambridge, MA, Nov. 2004.
- “The Importance of M-Shell Iron 3 to 3 Dielectronic Recombination in Active Galactic Nuclei,” Atomic Collision Dynamics (Energieriche Atomare Stöße), Riezlern im Kleinwalsertal, Austria, Feb. 2004.
- “Uncertainties in Chemical Abundances and the Metagalactic Radiation Field at High Redshift,” Israeli National Astrophysics Conference Series, Rehovot, Israel, Feb. 2003.

- “Ion Storage Ring Measurements of Dielectronic Recombination for Astrophysically Relevant Iron Ions: A Progress Report,” 17th International Conference on the Application of Accelerators in Research and Industry, Denton, TX, Nov. 2002.
- “Ion Storage Ring Measurements of Low Temperature Dielectronic Recombination Rate Coefficients for Modeling X-Ray Photoionized Cosmic Plasmas,” NASA Laboratory Astrophysics Workshop, Moffett Field, CA, May 2002.
- “Dielectronic Recombination: Theory, Experiment, and Some Astrophysical Implications,” Workshop on Complex Phenomena Involving Rydberg Atoms and Molecules, Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, Apr. 2001.
- “Measurements of Low Temperature Dielectronic Recombination in *L*-Shell Iron for Modeling X-Ray Photoionized Cosmic Plasmas,” 12th APS Topical Conference on Atomic Processes in Plasmas, Reno, NV, Mar. 2000.
- “Modeling X-Ray Photoionized Plasmas: Ion Storage Ring Measurements of Low Temperature Dielectronic Recombination Rate Coefficients for L-Shell Iron,” Atomic Data Needs for X-Ray Astronomy, Goddard Space Flight Center, Greenbelt, MD, Dec. 1999.
- “Dielectronic Recombination: An Overview of Theory and Experiment and Some Astrophysical Implications,” Astrophysical Plasmas: Codes, Models, and Observations, Mexico, City, Mexico, Oct. 1999.
- “Ion Storage Ring Measurements of Dielectronic Recombination for Astrophysically Relevant  $\text{Fe}^{q+}$  Ions,” 15th International Conference on the Application of Accelerators in Research and Industry, Denton, TX, Nov. 1998.
- “Ion Storage Ring Measurements for Understanding Line Emission and Ionization and Thermal Structures of Photoionized Gas,” NASA Laboratory Space Science Workshop, Cambridge, MA, Apr. 1998.
- “The Effects of Electron Spiraling on the Anisotropy and Polarization of Photon Emission from an Electron Beam Ion Trap,” International Seminar on Plasma Polarization Spectroscopy, Kyoto, Japan, Jan. 1998.
- “Measurements of Dielectronic Recombination for Astrophysics,” Workshop on Ion-Electron Collisions in Storage Rings, Heidelberg, Germany, Dec. 1997.
- “Laboratory Astrophysics: Measurements of  $n = n'$  to  $n = 2$  Line Emission in  $\text{Fe}^{16+}$  to  $\text{Fe}^{23+}$ ,” 10th APS Topical Conference on Atomic Processes in Plasmas, San Francisco, CA, Jan. 1996.
- “Low Temperature Dielectronic Recombination Measurements for Astrophysics,” Rates, Codes, and Astrophysics Workshop, AXAF Science Center, Cambridge, MA, Jul. 1995.
- “Atomic Data Needs for X-Ray Astronomy”, American Astronomical Society, High Energy Astrophysics Division Meeting, Napa, CA, Nov. 1994.

## Invited Colloquia and Seminars

- Stockholm University, Stockholm, Sweden, Nov. 2011.
- American Museum of Natural History, New York, NY, May 2011.
- Weizmann Institute of Science, Rehovot, Israel, Jan. 2011.
- Tel Aviv University, Jan. 2011.
- Technion University, Haifa, Israel, Jan. 2011.
- Columbia University, New York, NY, Sep. 2010.
- Charles University, Prague, Czech Republic, May 2010.
- Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, Apr. 2010.
- University of Nevada, Reno, NV, Jan. 2010.



Université Catholique de Louvain, Louvain-la-Neuve, Belgium, Oct. 2009.  
 Technion University, Haifa, Israel, Dec. 2006.  
 University of Giessen, Giessen, Germany, Dec. 2006.  
 Tokyo Metropolitan University, Japan, Apr. 2006.  
 International Christian University, Tokyo, Japan, Apr. 2006.  
 Institute of Space and Astronautical Science, Japanese Aerospace Exploration Agency, Tokyo, Japan, Apr. 2006.  
 University of Wisconsin, Madison, WI, Feb. 2006.  
 Air Force Research Laboratory, Hanscom Air Force Base, MA, Sep. 2005.  
 University of Nebraska, Lincoln, NE, Sep. 2005.  
 Charles University, Prague, Czech Republic, Mar. 2005.  
 University of Wisconsin, Madison, WI, Feb. 2005.  
 University of Tennessee, Knoxville, TN, Feb. 2005.  
 University of Georgia, Athens, GA, Feb. 2005.  
 Stockholm University, Sweden, Apr. 2004.  
 Technion University, Haifa, Israel, Jun. 2003.  
 Tel Aviv University, Israel, May 2003.  
 University of Toledo, Toledo, OH, Nov. 2002.  
 College of William and Mary, Williamsburg, VA, Apr. 2002.  
 Observatoire de Paris-Meudon, France, Jan. 2002.  
 Wesleyan University, Middletown, CT, Nov. 2001.  
 University of Connecticut, Storrs, CT, Nov. 2001.  
 University of Georgia, Athens, GA, Oct. 2001.  
 Oak Ridge National Laboratory, Oak Ridge, TN, Apr. 2001.  
 National Institute for Fusion Science, Toki, Japan, Mar. 2001.  
 University of Oklahoma, Norman, OK, Feb. 2001.  
 Appalachian State University, Boone, NC, Nov. 2000.  
 Naval Research Laboratory, Washington, DC, Aug. 2000.  
 National Institute of Standards and Technology, Gaithersburg, MD, Aug. 2000.  
 Ohio State University, Columbus, OH, Apr. 2000.  
 University of Kentucky, Lexington, KY, Mar. 2000.  
 Auburn University, Auburn, AL, Nov. 1999.  
 Georgia State University, Atlanta, GA, Nov. 1999.  
 Max Planck Institute for Plasma Physics, Berlin, Germany, May 1999.  
 Max Planck Institute for Nuclear Physics, Heidelberg, Germany, Apr. 1999.  
 Max Planck Institute for Astronomy, Heidelberg, Germany, Apr. 1999.  
 University of Wisconsin, Madison, WI, Feb. 1999.  
 Western Michigan University, Kalamazoo, MI, Feb. 1999.  
 Weizmann Institute of Science, Rehovot, Israel, Nov. 1998.  
 Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, Aug. 1997.  
 Max Planck Institute for Nuclear Physics, Heidelberg, Germany, Apr. 1996.  
 University of Nevada, Las Vegas, NV, Mar. 1996.  
 Harvard-Smithsonian Center for Astrophysics, Cambridge, MA, Apr. 1995.  
 University of Kentucky, Lexington, KY, Feb. 1995.  
 Oak Ridge National Laboratory, Oak Ridge, TN, Feb. 1995.  
 Lawrence Livermore National Laboratory, Livermore, CA, Feb. 1993.  
 Naval Research Laboratory, Washington, DC, Feb. 1993.  
 National Institute of Standards and Technology, Gaithersburg, MD, Feb. 1993.

## Press Interviews

“Columbia University’s Daniel Wolf Savin describes the chemistry underlying early star formation,”  
National Science Foundation Press Conference, Jun. 30, 2010.

## Lectures for the General Public and High Schools

State University of New York, Astronomy Lecture and Star Gazing, Newburgh, NY, Sep. 23, 2011.  
Picnic Café, Café Science, Manhattan, NY, Aug. 8, 2011.

Hudson River Museum, Science Sunday, Yonkers, NY, Mar. 27, 2011.

New Rochelle High School Research Class, New Rochelle, NY, Jan. 19, 2011.

Columbia University, Department of Astronomy Public Outreach Lecture, New York, NY, Dec. 3,  
2010.

Curtis High School, Junior and Senior Physics Classes of Ms. Alia Davis, Staten Island, NY, Oct.  
2, 2009.

## Radio Interviews for the General Public

On “You’d Prefer an Astronaut,” Vassar College Radio (<http://astroshow.blogspot.com/>). The  
interview is at <http://astroshow.blogspot.com/2007/12/interview-with-dr-savin.html>

## Science Articles for the General Public

“Cosmic Code Breakers”, D. W. Savin, B. J. McCall, and K. Kirby, *Australian Sky & Telescope*,  
August/September 2009, p. 36.

“Fare Astrophysica in Laboratorio (Doing Astrophysics in the Laboratory),” D. W. Savin, B. J.  
McCall, and K. Kirby, *Le Stelle (The Stars)*, Luglio 2007 (July 2007), p. 40, (in Italian).

“Kosmoische Kryptologie (Cosmic Cryptography),” D. W. Savin, B. J. McCall, and K. Kirby,  
*Astronomie Heute (Astronomy Today)*, Juni 2007 (June 2007), p. 28, (in German).

“Cosmic Codebreakers: Unraveling the Mysteries of the Universe,” D. W. Savin, B. J. McCall, and  
K. Kirby, *Sky & Telescope*, March 2007, p. 33.

## Courses Taught

Spring 2009 Stellar Structure and Evolution (Astronomy C3101y), Columbia University,  
Junior level undergraduate class.

## Undergraduates Mentored

Alex Olivas (Physics, University of California, Berkeley, Fall 1994).

Simone Höck (Physics, University of Tübingen, Germany, Summer 2009).

Ryan Mandelbaum (Physics, Columbia University, Summer 2010).

Jose Luis Montelongo (Astronomy, Columbia University, Fall 2011-present).

Warit Mitthumsiri (Physics, Columbia University, Summer 2004 - Spring 2007).

Hillel Rubinstein (Physics, Weizmann Institute of Science, Rehovot, Israel, Summer 2003).

Benjamin L. Schmitt (Physics and Astronomy, University of Rochester, Summer 2008).

Adam Shapiro (Physics, Columbia University, Spring 1999).

## **Graduate Students Mentored**

Anthony Mroczkowski (Astronomy, Columbia University, Second Year Project, 2001-2002).

## **Ph.D. Thesis Defense Committees**

Michael R. Fogle, Jr. (Physics, Stockholm University, 04/2004).

Xabier Sarasola Martin (Applied Physics and Applied Mathematics, Columbia University, 05/2011).

## **Postdoctoral Scientists Mentored**

Julian Berengut (visiting from University of New South Wales, 09/2007-04/2008)

Hjalmar Bruhns (Columbia University, 07/2006-12/2008).

Paul Bryans (Columbia University, 10/2005-09/2008).

Mauricio Garrido (Columbia University, 07/2010-07/2011).

Michael Hahn (Columbia University, 05/2009-present).

Holger Kreckel (Columbia University, 03/2007-01/2009).

Duck-Hee Kwon (visiting from Korea Atomic Energy Research Institute, 09/2009-01/2011).

Michael Lestinsky (Columbia University, 07/2007-06/2010).

Dragan Lukić (Columbia University, 02/2005-08/2007).

Kenneth A. Miller (Columbia University, 11/2008-present).

Oldřich Novotný (Columbia University, 07/2009-present).

Aodh O'Connor (Columbia University, 04/2010-present).

Michael Schnell (Columbia University, 04/2004-03/2006).

Bohdan Serebyuk (Columbia University, 02/2006-12/2007).

Julia Stützel (Columbia University, 07/2011-present).

## **High School Science Teacher Fellows Mentored**

Alia Davis (Curtis High School, Staten Island, NY, Summers 2009 and 2010).

Bruce Zeller (New Rochelle High School, New Rochelle, NY, Summer 2011).

## **High School Students Mentored**

Jesse Voremberg (Heschel High School, New York NY, Summer 2010).

### III. Administrative Experience

#### University Service

- 2005-2007 Alumni Relations Committee, Columbia University Senate, Member.
- 2005-present Budget Review Committee, Columbia University Senate, Member.
- 2005-present Structure and Operations Committee, Columbia University Senate, Member.
- 2004-2005 Honors & Prizes Committee, Columbia University Senate, Member.
- 2004-2005 External Relations & Research Policy Comm., Columbia Univ. Senate, Member.
- 2004-present Research Officers Committee, Columbia University Senate, Chair.
- 2003-2004 Researcher Officers Committee, Columbia University Senate, Member.
- 2003-present Columbia University Senate, Senator.
- 2001-2002 Ad Hoc Researchers' Committee of the Columbia University Senate, Member.

#### Presentations to National Advisory Committees

- 04/2007 National Academy of Science, Plasma Science Committee, Washington, DC, "Report on the 2006 NASA-Sponsored Laboratory Astrophysics Workshop".
- 11/2006 National Academy of Sciences, Committee on Astron. and Astrophys., Irvine, CA, "Report on the 2006 NASA-Sponsored Laboratory Astrophysics Workshop".
- 11/2006 American Physical Society, Physics Policy Committee, Washington, DC, "Report on the 2006 NASA-Sponsored Laboratory Astrophysics Workshop".
- 11/2006 Board on Physics and Astronomy, National Academy of Sciences, Irvine, CA, "Report on the 2006 NASA-Sponsored Laboratory Astrophysics Workshop".

#### Service on International Bodies

- 2009-present International Conference on Photonic, Electronic, and Atomic Collisions, General Committee, Member.

#### Service on National Bodies

- 2011-present American Astronomical Society, Working Group on Laboratory Astrophysics, Chair.
- 2009 American Physical Society, Division of Atomic, Molecular, and Optical Physics, Program Committee, Subcommittee Chair.
- 2008-2011 American Physical Society, Division of Atomic, Molecular, and Optical Physics, Program Committee, Member.
- 2007-2008 Constellation-X Facility Science Team, Panel on Plasma Diagnostics and Atomic Astrophysics.
- 2007-present American Astronomical Society, Working Group on Laboratory Astrophysics, Member.
- 2003-2011 South East Laboratory Astrophysics Consortium, Executive Committee Member.

## Conference Organizing Committees and Service

- 06/2011 American Physical Society, Division of Atomic and Molecular Physics, Session Chair (Recent Advances in Collision Studies).
- 05/2010 American Physical Society, Division of Atomic and Molecular Physics, Session Organizer and Chair (Atomic and Molecular Physics in the Early Universe).
- 10/2010 NASA-sponsored 2010 Laboratory Astrophysics Workshop, Science Organizing Committee, Chair.
- 08/2010 Eighth International Conference on Dissociative Recombination: Theory, Experiments & Applications, Session Chair.
- 05/2010 American Astronomical Society, Meeting within a Meeting Co-Organizer (Bridging Laboratory and Astrophysics: Frontiers in Plasma Astrophysics).
- 01/2010 American Astronomical Society, Special Session Organizer and Chair, (Planetary Cosmology).
- 05/2009 American Physical Society, Division of Atomic and Molecular Physics, Session Organizer and Chair, (Breakthroughs in Molecular Physics).
- 06/2008 American Astronomical Society, Topical Session Co-Organizer, (Bridging Laboratory and Astrophysics).
- 05/2008 American Physical Society, Division of Atomic and Molecular Physics, Session Organizer and Chair, (The Molecular Basis of Astrobiology).
- 02/2008 Atomic Ion Stage Abundances in Astrophysical Plasmas, South East Laboratory Astrophysics Workshop, Science Organizing Committee and Local Organizing Committee.
- 04/2006 US-Japan Symposium on Collision-Induced X-Ray Emission and Antimatter Physics, Session Chair.
- 02/2006 NASA Laboratory Astrophysics Workshop 2006, Science Organizing Committee and Session Chair.
- 06/2005 American Astronomical Society, Topical Session Co-Organizer and Session Chair (Highlights in Laboratory Astrophysics: Bringing Together Users and Providers).
- 10/2004 Joint Meeting of the 14th International Toki Conference on Plasma Physics and Controlled Nuclear Fusion and the 4th International Conference on Atomic and Molecular Data and Their Applications, Session Chair (Astrophysics).
- 06/2004 Solar Physics Division and American Astronomical Society Joint Meeting, Topical Session Organizer and Chair (Improving Our Understanding of Solar and Stellar Coronae: Recent Efforts in Atomic Physics).
- 06/2003 South East Laboratory Astrophysics Workshop, Science Organizing Committee (SOC) Member, and Session Co-convenor (X-ray/EUV Working Group).
- 11/2000 Photoionized Plasmas 2000, SOC Member, and Session Chair (Basic Atomic/Molecular Processes).

## Grant Proposals Reviewed

Numerous grant proposals reviewed for the following agencies and programs:

Department of Energy Opportunities in Basic Plasma Science.

Deutsche Forschungsgemeinschaft (DFG, German Research Foundation) Priority Program (Schwerpunktprogramm, SPP) on the physics of the interstellar medium.

European Research Council Starting Grant Program

PPARC (the UK Particle Physics and Astronomy Research Council).  
NASA Astronomy and Physics Research and Analysis Program.  
NASA Astrophysics Theory Program/Beyond Einstein Foundation Science.  
NASA Herschel Theoretical Research and Laboratory Astrophysics Programs.  
NASA Heliophysics Research Program.  
NASA Sun-Earth Connection Program.  
NASA Planetary Atmospheres Program.  
NASA Postdoctoral Program.  
NSF Division of Atmospheric and Geospace Sciences: Solar, Heliospheric, and INterplanetary Environment (SHINE) Program.  
NSF Graduate Research Fellowship Program.  
NSF Division of Physics: Major Research Instrumentation Program.

## **Reviews for Journal and Encyclopedia Articles**

Served as referee for the following journals and publications:

Astronomical Journal  
Astronomy and Astrophysics  
Canadian Journal of Physics  
Journal of Plasma and Fusion Research Series  
Journal of Physics: Conference Series  
Journal of Quantitative Spectroscopy and Radiative Transfer  
The Astrophysical Journal Letters  
The Astrophysical Journal  
The Astrophysical Journal Supplemental Series  
Physical Review A  
Physical Review Letters  
Reports on Progress in Physics  
Review of Modern Physics  
Wiley Encyclopedia of Electrical and Electronic Engineering

## IV. Publications

### Books

*Spectroscopic Challenges of Photoionized Plasmas*, ed. G. J. Ferland and **D. W. Savin**, (Astronomical Society of the Pacific, Provo, Utah, 2001).

### Book Chapters

“Negative Hydrogen Chemistry in the Early Universe”, H. Kreckel and **D. W. Savin**, in *Modern Concepts in Laboratory Astrochemistry*, ed. S. Schlemmer, H. Mutschke, and Th. Giesen, (Wiley, Weinheim, Germany, in press).

### Refereed Publications

72. “Associative detachment of  $H^- + H \rightarrow H_2 + e^-$ ”, K. A. Miller, H. Bruhns, J. Eliášek, M. Čížek, H. Kreckel, X. Urbain, and **D. W. Savin**, *Phys. Rev. A*, **84**, 052709 (2011).
71. “Differential Emission Measure Analysis of a Polar Coronal Hole During the Solar Minimum in 2007”, M. Hahn, E. Landi, and **D. W. Savin**, *Astrophys. J.* **736**, 101 (2011).
70. “Storage Ring Cross Section Measurements for Electron Impact Ionization of  $Fe^{12+}$  Forming  $Fe^{13+}$  and  $Fe^{14+}$ ”, M. Hahn, M. Grieser, C. Krantz, M. Lestinsky, A. Müller, O. Novotný, R. Repnow, S. Schippers, A. Wolf and **D. W. Savin** *Astrophys. J.* **735**, 105 (2011).
69. “Effects of Configuration Interaction for Dielectronic Recombination of Na-like Ions Forming Mg-like Ions”, D.-H. Kwon and **D. W. Savin**, *Astrophys. J.* **734** 2 (2011).
68. “Storage Ring Cross Section Measurements for Electron Impact Ionization of  $Fe^{11+}$  Forming  $Fe^{12+}$  and  $Fe^{13+}$ ”, M. Hahn, D. Bernhardt, M. Grieser, C. Krantz, M. Lestinsky, A. Müller, O. Novotný, R. Repnow, S. Schippers, A. Wolf, and **D. W. Savin**, *Astrophys. J.* **729**, 76 (2011).
67. “Dielectronic recombination of xenonlike tungsten ions”, S. Schippers, D. Bernhardt, A. Müller, C. Krantz, M. Grieser, R. Repnow, A. Wolf, M. Hahn, O. Novotný, and **D. W. Savin**, *Phys. Rev. A* **83**, 012711 (2011).
66. “ $Fe^{15+}$  dielectronic recombination and the effects of configuration interaction between resonances with different captured electron principal quantum number”, D.-H. Kwon and **D. W. Savin**, *Phys. Rev. A*, **83**, 012701 (2011).
65. “Dielectronic recombination data for astrophysical applications: Plasma rate coefficients for  $Fe^{q+}$  ( $q = 7 - 10, 13 - 22$ ) and  $Ni^{25+}$  ions from storage-ring experiments”, S. Schippers, M. Lestinsky, A. Müller, **D. W. Savin**, E. Schmitt, and A. Wolf, *Int. Rev. At. Phys.* **1**, 109 (2010).
64. “Properties of a Polar Coronal Hole During the Solar Minimum in 2007”, M. Hahn, P. Bryans, E. Landi, M. P. Miralles, and **D. W. Savin**, *Astrophys. J.*, **725**, 774 (2010).

63. “Absolute energy-resolved measurements of the  $H^- + H \rightarrow H_2 + e^-$  associative detachment reaction using a merged-beam apparatus”, H. Bruhns, H. Kreckel, K. A. Miller, X. Urban, and **D. W. Savin**, *Phys. Rev. A*, **82**, 042708 (2010).
62. “Experimental Results for  $H_2$  Formation from  $H^-$  and  $H$  and Implications for First Star Formation”, H. Kreckel, H. Bruhns, M. Čížek, S. C. O. Glover, K. A. Miller, X. Urbain, and **D. W. Savin**, *Science*, **329**, 69 (2010).
61. “A simple double-focusing electrostatic ion beam deflector”, H. Kreckel, H. Bruhns, K. A. Miller, E. Wählin, A. Davis, S. Höchke, and **D. W. Savin**, *Rev. Sci. Instrum.* **81**, 063304 (2010).
60. “Storage Ring Measurements of Electron Impact Ionization for  $Mg^{7+}$  forming  $Mg^{8+}$ ”, M. Hahn, D. Bernhardt, M. Lestinsky, A. Müller, O. Novotný, S. Schippers, A. Wolf, and **D. W. Savin**, *Astrophys. J.* **712**, 1166 (2010).
59. “A novel merged beams apparatus to study anion-neutral reactions”, H. Bruhns, H. Kreckel, K. Miller, M. Lestinsky, B. Seredyuk, W. Mitthumsiri, B. L. Schmitt, M. Schnell, X. Urbain, M. L. Rappaport, and C. C. Havener, and **D. W. Savin**, *Rev. Sci. Instrum.* **81**, 013112 (2010).
58. “Deriving the Coronal Hole Electron Temperature: Electron Density Dependent Ionization/Recombination Considerations”, J. G. Doyle, S. Chapman, P. Bryans, D. Pérez-Suárez, A. Singh, H. Summers, and **D. W. Savin**, *Res. Astron. Astrophys.* **10**, 91 (2010).
57. “Electron-ion Recombination of Fe X forming Fe IX and of Fe XI forming Fe X: Laboratory Measurements and Theoretical Calculations”, M. Lestinsky, N. R. Badnell, D. Bernhardt, M. Grieser, J. Hoffmann, D. V. Lukić, A. Müller, D. A. Orlov, R. Repnow, **D. W. Savin**, E. W. Schmidt, M. Schnell, S. Schippers, A. Wolf and D. Yu, *Astrophys. J.* **698**, 648 (2009).
56. “Is  $H_3^+$  cooling ever important in primordial gas?”, S. C. O. Glover and **D. W. Savin**, *Mon. Not. R. Astron. Soc.*, **393**, 911 (2009).
55. “Molecular Cloud Chemistry and the Importance of Dielectronic Recombination”, P. Bryans, H. Kreckel, E. Roueff, V. Wakelam, and **D. W. Savin**, *Astrophys. J.*, **694** 286 (2009).
54. “A New Approach to Analyzing Solar Coronal Spectra and Updated Collisional Ionization Equilibrium Calculations. II. Updated Ionization Rate Coefficients”, P. Bryans, E. Landi, and **D. W. Savin**, *Astrophys. J.*, **691**, 1540 (2009).
53. “Electron-ion recombination for Fe VIII forming Fe VII and Fe IX forming Fe VIII: measurements and theory”, E. W. Schmidt, S. Schippers, D. Bernhardt, A. Müller, J. Hoffmann, M. Lestinsky, D. A. Orlov, A. Wolf, D. V. Lukić, **D. W. Savin**, and N. R. Badnell, *Astron. Astrophys.* **492**, 265 (2008).
52. “Low-energy charge transfer for collisions of  $Si^{3+}$  with atomic hydrogen”, H. Bruhns, H. Kreckel, **D. W. Savin**, D. G. Seely and C. C. Havener, *Phys. Rev. A* **77**, 064702 (2008).
51. “Electron-Impact Ionization of Be-like C III, N IV, and O V”, M. Fogle, E. M. Bahati, M. E. Bannister, C. R. Vane, S. D. Loch, M. S. Pindzola, C. P. Ballance, R. D. Thomas, V. Zhaunerchyk, P. Bryans, W. Mitthumsiri, and **D. W. Savin**, *Astrophys. J. Suppl. Ser.* **175**, 543 (2008).



50. “Orbital sensitivity in  $\text{Mg}^{2+}$  dielectronic recombination”, J. Fu, T. W. Gorczyca, D. Nikolic, N. R. Badnell, D. W. Savin, and M. F. Gu, *Phys. Rev. A* **77**, 032713 (2008).
49. “Rotating Dual-Wire Beam Profile Monitor Optimized for use in Merged-Beams Experiments”, D. G. Seely, H. Bruhns, D. W. Savin, T. J. Kvale, E. Galutschek, H. Aliabadi and C. C. Havener, *Nucl. Instrum. Methods A* **585**, 69 (2008).
48. “Electron-Ion Recombination of Si IV forming Si III: Storage-Ring Measurement and Multi-configuration Dirac-Fock Calculations”, E. W. Schmidt, D. Bernhardt, A. Müller, S. Schippers, S. Fritzsche, J. Hoffmann, A. S. Jaroshevich, C. Krantz, M. Lestinsky, D. A. Orlov, A. Wolf, D. Lukić, and **D. W. Savin**, *Phys. Rev. A* **76**, 032717 (2007).
47. “Dielectronic Recombination of Fe XV Forming Fe XIV: Laboratory Measurements and Theoretical Calculations”, D. V. Lukić, M. Schnell, **D. W. Savin**, C. Brandau, E. W. Schmidt, S. Böhm, A. Müller, S. Schippers, M. Lestinsky, F. Sprenger, A. Wolf, Z. Altun, and N. R. Badnell, *Astrophys. J.* **664**, 1244 (2007).
46. “Low-Energy Electron Capture by  $\text{Ne}^{2+}$  Ions from H(D)”, B. Seredyuk, H. Bruhns, **D. W. Savin**, D. Seely, H. Aliabadi, E. Galutschek, and C. C. Havener, *Phys. Rev. A* **75**, 054701 (2007).
45. “Collisional Ionization Equilibrium for Optically Thin Plasmas. I. Updated Recombination Rate Coefficients for Bare though Sodium-like Ions”, P. Bryans, N. R. Badnell, T. W. Gorczyca, J. M. Laming, W. Mitthumsiri, and **D. W. Savin**, *Astrophys. J. Suppl. Ser.* **167**, 343 (2006).
44. “Strong *LSJ* Dependence of Fluorescence Yields: Breakdown of the Configuration-Average Approximation”, M. F. Hasoğlu, T. W. Gorczyca, K. T. Korista, S. T. Manson, N. R. Badnell, and **D. W. Savin**, *Astrophys. J. Lett.* **649**, L149 (2006).
43. “Dielectronic Recombination of Fe XXIII forming Fe XXII: Laboratory Measurements and Theoretical Calculations”, **D. W. Savin**, G. Gwinner, M. Grieser, R. Repnow, M. Schnell, D. Schwalm, A. Wolf, S.-G. Zhou, S. Kieslich, A. Müller, S. Schippers, J. Colgan, S. D. Loch, M. H. Chen, and M. F. Gu, *Astrophys. J.* **642**, 1275 (2006).
42. “Electron-Ion Recombination Measurements Motivated by AGN X-Ray Absorption Features: Fe XIV forming Fe XIII”, E. W. Schmidt, S. Schippers, A. Müller, M. Lestinsky, F. Sprenger, M. Grieser, R. Repnow, A. Wolf., C. Brandau, D. Lukić, M. Schnell, and **D. W. Savin**, *Astrophys. J. Lett.* **641**, L157 (2006).
41. “Cosmological Implications of the Uncertainty in  $\text{H}^-$  Destruction Rates”, S. Glover, **D. W. Savin**, and A.-K. Jappsen, *Astrophys. J.* **640**, 553 (2006).
40. “Importance of Configuration Interaction for Accurate Atomic Data: Fluorescence Yields of K-Shell Vacancy for Lithium-Like Ions”, T. W. Gorczyca, I. Dumitriu, M. F. Hasoğlu, K. T. Korista, N. R. Badnell, **D. W. Savin**, and S. T. Manson, *Astrophys. J. Lett.* **638**, L121 (2006).
39. “Dielectronic Recombination Data for Dynamic Finite-Density Plasmas. X. The Fluorine Isoelectronic Sequence”, O. Zatsarinny, T. W. Gorczyca, J. Fu, K. T. Korista, N. R. Badnell, and **D. W. Savin**, *Astron. Astrophys.* **447**, 379 (2006).

38. “Low Energy Electron Capture by  $\text{Ne}^{4+}$  Ions on Atomic Hydrogen”, C. C. Havener, R. Rejoub, C. R. Vane, H. F. Krause, **D. W. Savin**, M. Schnell, J. G. Wang, and P. C. Stancil, *Phys. Rev. A* **71**, 034702 (2005).
37. “Dielectronic Recombination Data for Dynamic Finite-Density Plasmas VII. The Neon Isoelectronic Sequence”, O. Zatsarinny, T. W. Gorczyca, K. Korista, N. R. Badnell, and **D. W. Savin**, *Astron. Astrophys.* **426**, 699 (2004).
36. “Low Energy Electron Capture by  $\text{Ne}^{3+}$  Ions on Atomic Hydrogen”, R. Rijoub, M. E. Banister, C. C. Havener, **D. W. Savin**, C. Verzania, J. G. Wang, and P. C. Stancil, *Phys. Rev. A* **69**, 052704 (2004).
35. “Rate Coefficient for  $\text{H}^+ + \text{H}_2 \rightarrow \text{H} + \text{H}_2^+$  Charge Transfer and Some Cosmological Implications”, **D. W. Savin**, P. S. Krstić, Z. Haiman, and P. C. Stancil, *Astrophys. J. Lett.* **606**, L167 (2004); Erratum **607**, L147 (2004).
34. “Dielectronic Recombination Data for Dynamic Finite-Density Plasmas: IV. The Carbon Isoelectronic Sequence”, O. Zatsarinny, T. W. Gorczyca, K. T. Korista, N. R. Badnell, and **D. W. Savin**, *Astron. Astrophys.* **417**, 1173 (2004); Erratum, O. Zatsarinny, T. W. Gorczyca, K. T. Korista, J. Fu, N. R. Badnell, W. Mitthumsiri, and **D. W. Savin**, *Astron. Astrophys.* **440**, 1203 (2005).
33. “Dielectronic Recombination Data for Dynamic Finite-Density Plasmas: II. The Oxygen Isoelectronic Sequence”, O. Zatsarinny, T. W. Gorczyca, K. T. Korista, N. R. Badnell, and **D. W. Savin**, *Astron. Astrophys.* **412**, 587 (2003); Erratum, O. Zatsarinny, T. W. Gorczyca, K. T. Korista, J. Fu, N. R. Badnell, W. Mitthumsiri, and **D. W. Savin**, *Astron. Astrophys.* **438**, 743 (2005).
32. “Electron Capture by  $\text{Ne}^{2+}$  Ions on Atomic Hydrogen”, T. Mroczkowski, **D. W. Savin**, R. Rejoub, P. S. Krstić, and C. C. Havener, *Phys. Rev. A* **68**, 032721 (2003).
31. “High Resolution Mass Spectrometry using a Linear Electrostatic Ion Beam Trap”, D. Zajfman, Y. Rudich, I. Sagi, D. Strasser, **D. Savin**, S. Goldberg, M. Rappaport, and O. Herber, *Int. J. Mass Spectrom.* **229**, 55 (2003).
30. “Dielectronic Recombination of Fe XXI and Fe XXII via  $N = 2 \rightarrow N' = 2$  Core Excitations”, **D. W. Savin**, S. M. Kahn, G. Gwinner, M. Grieser, R. Repnow, G. Saathoff, D. Schwalm, A. Wolf, A. Müller, S. Schippers, P. A. Závodszky, M. H. Chen, T. W. Gorczyca, O. Zatsarinny, and M. F. Gu, *Astrophys. J. Suppl. Ser.* **147**, 421 (2003).
29. “Assessment of the Fluorescence and Auger Data Base used in Plasma Modeling”, T. W. Gorczyca, C. N. Kodituwakku, K. T. Korista, O. Zatsarinny, and N. R. Badnell, E. Behar, M. H. Chen, and **D. W. Savin**, *Astrophys. J.* **592**, 636 (2003).
28. “Dielectronic Recombination of Fe XIX Forming Fe XVIII: Laboratory Measurements and Theoretical Calculations”, **D. W. Savin**, S. M. Kahn, J. Linkemann, A. A. Saghiri, M. Schmitt, M. Grieser, R. Repnow, D. Schwalm, A. Wolf, T. Bartsch, A. Müller, S. Schippers, M. H. Chen, N. R. Badnell, T. W. Gorczyca, and O. Zatsarinny, *Astrophys. J.* **576**, 1098 (2002).
27. “Shortcomings of the R-Matrix Method for Treating Dielectronic Recombination Rate Coefficients”, T. W. Gorczyca, N. R. Badnell, and **D. W. Savin**, *Phys. Rev. A* **65**, 062707 (2002).

26. “Dielectronic Recombination (via  $2 \rightarrow 2$  Core Excitations) and Radiative Recombination onto Fe XX: Laboratory Measurements and Theoretical Calculations”, **D. W. Savin**, E. Behar, S. M. Kahn, G. Gwinner, A. A. Saghir, M. Schmitt, M. Grieser, R. Repnow, D. Schwalm, A. Wolf, T. Bartsch, A. Müller, S. Schippers, N. R. Badnell, M. H. Chen, and T. W. Gorczyca, *Astrophys. J. Suppl. Ser.* **138**, 337 (2002).
25. “Uncertainties in Dielectronic Recombination Rates: Effects on Solar and Stellar Upper Atmosphere Abundance Determinations,” **D. W. Savin**, and J. M. Laming, *Astrophys. J.* **566**, 1166 (2002).
24. “Rate Coefficients for  $D(1s) + H^+ \rightleftharpoons D^+ + H(1s)$  Charge Transfer and Some Astrophysical Implications”, **D. W. Savin**, *Astrophys. J.* **566**, 599 (2002).
23. “Laboratory Measurements of Iron L Shell Emission:  $3 \rightarrow 2$  Transitions of Fe XXI – XXIV Between 10.5 Å and 12.5 Å”, M. F. Gu, S. M. Kahn, **D. W. Savin**, E. Behar, P. Beiersdorfer, G. V. Brown, D. A. Liedahl, and K. J. Reed, *Astrophys. J.* **563**, 462 (2001).
22. “Interstellar X-Ray Absorption Spectroscopy of Oxygen, Neon, and Iron with the Chandra LETGS Spectrum of X0614+091”, F. Paerels, A. C. Brinkman, R. L. J. van der Meer, J. S. Kaastra, E. Kuulkers, A. J. F. den Boggende, P. Predehl, J. J. Drake, S. M. Kahn, **D. W. Savin**, and B. M. McLaughlin, *Astrophys. J.* **546**, 338 (2001).
21. “Simulating a Maxwellian Plasma using an Electron Beam Ion Trap”, **D. W. Savin**, P. Beiersdorfer, S. M. Kahn, B. R. Beck, G. V. Brown, M. F. Gu, D. A. Liedahl, and J. H. Scofield, *Rev. Sci. Instrum.* **71**, 3362 (2000).
20. “Experimental M1 Transition Rates of Coronal Lines from Ar X, Ar XIV, and Ar XV”, E. Träbert, S. B. Utter, P. Beiersdorfer, G. V. Brown, H. Chen, C. Harris, P. Neill, **D. W. Savin**, and A. J. Smith, *Astrophys. J.* **541**, 506 (2000).
19. “Ionization Balance, Chemical Abundances and the Metagalactic Radiation Field at High Redshift”, **D. W. Savin**, *Astrophys. J.* **533**, 106 (2000).
18. “Effects of Electron Spiraling on the Anisotropy and Polarization of Photon Emission from an Electron Beam Ion Trap”, M. F. Gu, **D. W. Savin**, and P. Beiersdorfer, *J. Phys. B* **32**, 5371 (1999).
17. “Experimentally Derived Dielectronic Recombination Rate Coefficients for Heliumlike C V and Hydrogenic O VIII”, **D. W. Savin**, *Astrophys. J.* **523**, 855 (1999).
16. “Improved EBIT Lifetime Measurement of the  $Ne^{8+} 1s2s \ ^3S_1$  Level”, E. Träbert, P. Beiersdorfer, G. V. Brown, A. J. Smith, S. B. Utter, M. F. Gu, and **D. W. Savin**, *Phys. Rev. A* **60**, 002034 (1999).
15. “Absolute Cross Section for  $Si^{2+}(3s^2 \ ^1S \rightarrow 3s3p \ ^1P)$  Electron-Impact Excitation”, D. B. Reisenfeld, L. D. Gardner, P. H. Janzen, **D. W. Savin**, and J. L. Kohl, *Phys. Rev. A* **60**, 1153 (1999).
14. “Dielectronic Recombination in Photoionized Gas. II. Laboratory Measurements for Fe XVIII and Fe XIX”, **D. W. Savin**, S. M. Kahn, M. Grieser, J. Linkemann, R. Repnow, A. A. Saghir, M. Schmitt, D. Schwalm, A. Wolf, T. Bartsch, C. Brandau, A. Hoffknecht, A. Müller, S. Schippers, M. H. Chen, and N. R. Badnell, *Astrophys. J. Suppl. Ser.* **123**, 687 (1999).

13. "Reevaluation of Experiments and New Theoretical Calculations for Electron-Impact Excitation of  $C^{3+}$ ", P. H. Janzen, L. D. Gardner, D. B. Reisenfeld, **D. W. Savin**, J. L. Kohl, and K. Bartschat, *Phys. Rev. A* **59**, 4821 (1999).
12. "Laboratory Measurements of Fe XXIV Line Emission:  $3 \rightarrow 2$  Transitions near Excitation Threshold", M. F. Gu, S. M. Kahn, **D. W. Savin**, P. Beiersdorfer, G. V. Brown, D. A. Liedahl, K. J. Reed, C. P. Bhalla, and S. R. Grabbe, *Astrophys. J.* **518**, 1002 (1999).
11. "Dielectronic Recombination for Boronlike Ions", M. H. Chen, K. J. Reed, D. S. Guo, and **D. W. Savin**, *Phys. Rev. A* **58**, 4539 (1998).
10. "Precision Measurement of the Lifetime of the  $1s2s^3S_1$  Metastable Level in Heliumlike  $O^{6+}$ ", J. Crespo López-Urrutia, P. Beiersdorfer, **D. W. Savin**, and K. Widmann, *Phys. Rev. A* **58**, 238 (1998).
9. "Dielectronic Recombination in Photoionized Gas: The Importance of Fine-Structure Core Excitations", **D. W. Savin**, T. Bartsch, M. H. Chen, S. M. Kahn, D. A. Liedahl, J. Linkemann, A. Müller, S. Schippers, M. Schmitt, D. Schwalm, and A. Wolf, *Astrophys. J. Lett.* **489**, L115 (1997).
8. "A High-Resolution Transmission-Type X-Ray Spectrometer Designed for Observation of the  $K\alpha$  Transitions of Highly Charged High-Z Ions", K. Widmann, P. Beiersdorfer, G. V. Brown, J. Crespo López-Urrutia, V. Decaux, and **D. W. Savin**, *Rev. Sci. Instrum.* **68**, 1087 (1997).
7. "Laboratory Measurements of Fe XXIV  $L$ -Shell Line Emission", **D. W. Savin**, P. Beiersdorfer, J. Crespo López-Urrutia, V. Decaux, E. M. Gullikson, S. M. Kahn, D. A. Liedahl, K. J. Reed, and K. Widmann, *Astrophys. J. (Letters)* **470**, L73 (1996).
6. "Observation of the Hyperfine Transition of the  $1s^2S_{1/2}$  Ground State of H-like  $^{165}\text{Ho}^{66+}$ ", J. R. Crespo López-Urrutia, P. Beiersdorfer, **D. W. Savin**, and K. Widmann, *Phys. Rev. Lett.* **77**, 826 (1996).
5. "Measurement and Interpretation of the Polarization of the X-Ray Line Emission of Heliumlike Fe XXV Excited by an Electron Beam", P. Beiersdorfer, D. A. Vogel, K. Reed, V. Decaux, J. Scofield, K. Widmann, G. Hölzer, E. Förster, O. Wehrhan, **D. W. Savin**, and L. Schweikhard, *Phys. Rev. A* **53**, 3974 (1996).
4. "Absolute Measurement of Dielectronic Recombination for  $C^{3+}$  in a Known External Field", **D. W. Savin**, L. D. Gardner, D. B. Reisenfeld, A. R. Young, and J. L. Kohl, *Phys. Rev. A* **53**, 280 (1996).
3. "Absolute Rate Coefficient for  $C^{3+}(2s - 2p)$  Electron Impact Excitation", **D. W. Savin**, L. D. Gardner, D. B. Reisenfeld, A. R. Young, and J. L. Kohl, *Phys. Rev. A* **51**, 2162 (1995).
2. "*In Situ* Absolute Calibration of a Channel Electron Multiplier for Detection of Positive Ions", **D. W. Savin**, L. D. Gardner, D. B. Reisenfeld, A. R. Young, and J. L. Kohl, *Rev. Sci. Instrum.* **66**, 67 (1995).
1. "Measurement of  $C^{3+}$  Dielectronic Recombination in a Known External Field", A. R. Young, L. D. Gardner, **D. W. Savin**, G. P. Lafyatis, A. Chutjian, S. Bliman, and J. L. Kohl, *Phys. Rev. A* **49**, 357 (1994).

## Conference Papers

53. “Recombination of  $\text{Au}^{20+}$  at low electron-ion collision energies”, S. Schippers, D. Bernhardt, M. Grieser, M. Hahn, C. Krantz, M. Lestinsky, O. Novotný, R. Repnow, **D. W. Savin**, A. Wolf, and A. Müller, 15th International Conference on the Physics of Highly Charged Ions, Phys. Scr. **T144**, 014039 (2011).
52. “Laboratory Simulations of Molecular Hydrogen Formation in the Early Universe: A Progress Report”, **D. W. Savin**, H. Bruhns, S. C. O. Glover, H. Kreckel, K. Miller, and X. Urbain, in *First Stars and Galaxies: Challenges in the Next Decade*, ed. D. Whalen (American Institute of Physics, New York), AIP Conf. Proc. **1294**, 62 (2010).
51. “Experimental Rate Coefficient for Dielectronic Recombination of Neonlike Iron”, E. W. Schmidt, D. Bernhardt, J. Hoffmann, M. Lestinsky, D. V. Lukić, D. A. Orlov, **D. W. Savin**, S. Schippers, A. Wolf, and D. Yu, 14th International Conference on the Physics of Highly Charged Ions, J. Phys. Conf. Ser. **163**, 012028 (2009).
50. “M-Shell Dielectronic Recombination: Theoretical Studies”, Sh. A. Abdel-Naby, D. Nikolić, T. W. Gorczyca, N. R. Badnell, and **D. W. Savin**, *Proceedings of the 15th International Conference on the Application of Accelerators in Research and Industry, Denton, Texas*, ed. F. D. McDaniel and B. L. Doyle (American Institute of Physics, New York), AIP Conf. Proc. **1099**, 111 (2008).
49. “Dielectronic recombination measurements of iron M-shell ions motivated by active galactic nuclei X-ray absorption features”, D. V. Lukić, M. Schnell, **D. W. Savin**, C. Brandau, E. W. Schmidt, S. Böhm, A. Müller, S. Schippers, M. Lestinsky, F. Sprenger, A. Wolf, Z. Altun, and N. R. Badnell, Publ. Astron. Obs. Belgrade **84**, 99 (2008).
48. “Analog and Digital Simulations of Maxwellian Plasmas for Astrophysics”, **D. W. Savin**, N. R. Badnell, P. Beiersdorfer, B. R. Beck, G. V. Brown, P. Bryans, T. W. Gorczyca, M. F. Gu, S. M. Kahn, J. M. Laming, D. A. Liedahl, W. Mitthumsiri, J. H. Scofield, and K. L. Wong, Can. J. Phys **86**, 209 (2008).
47. “Can Heavy Ion Storage Rings Contribute to Our Understanding of the Charge State Distributions in Cosmic Atomic Plasmas?”, **D. W. Savin**, J. Phys. Conf. Ser. **88**, 012071 (2007).
46. “Steps Toward Dielectronic Recombination of Argon-like Ions: A Revisited Theoretical Investigation of  $\text{Sc}^{3+}$  and  $\text{Ti}^{4+}$ ,” D. Nikolić, T. W. Gorczyca, J. Fu, **D. W. Savin**, and N. R. Badnell, in *Proceedings of the 19th International Conference on the Application of Accelerators in Research and Industry, Denton, Texas*, Nucl. Instrum. Methods B **261**, 145 (2007).
45. “Some Ionization and Recombination Data Needs for Cosmic Atomic Plasmas”, **D. W. Savin**, in *Atomic Processes in Plasmas - 15<sup>th</sup> International Conference on Atomic Processes in Plasmas*, eds. J. D. Gillaspay, J. J. Curry, and W. L. Wiese (American Institute of Physics, New York), AIP Conf. Proc. **926**, 124 (2007).
44. “Electron-Ion Recombination Measurements of  $\text{Fe}^{7+}$ ,  $\text{Fe}^{8+}$ , and  $\text{Fe}^{13+}$  Motivated by Active Galactic Nuclei X-Ray Absorption Features”, E. W. Schmidt, S. Schippers, C. Brandau, D. Bernhardt, D. Yu, A. Müller, M. Lestinsky, F. Sprenger, J. Hoffman, D. A. Orlov, M. Grieser,

- R. Repnow, A. Wolf, D. Lukić, M. Schnell, and **D. W. Savin**, J. Phys. Conf. Ser. **58**, 223 (2007).
43. “ $\text{H}_3^+$  Cooling in Primordial Gas”, S. Glover and **D. W. Savin**, Phil. Trans. R. Soc. London A. **364**, 3107 (2006).
  42. “Measurements of Atomic and Molecular Parameters of Hydrogen and Nitrogen for Solar Physics”, A. Daw, A. G. Calamai, S. Brewer, B. Myer, D. W. Savin, and M. Schnell, in *Proceedings of the International Symposium on Solar Physics and Solar Eclipses (SPSE 2006)*, edited by R. Ramelli, O. Shalabiea, I. Saleh, J. O. Stenflo, p. 109.
  41. “Dipole Polarization Effects on Highly-Charged-Ion-Atom Electron Capture”, C. C. Havener, S. L. Hough, R. Rejoub, M. Schnell, **D. W. Savin**, in *Proceedings of the XXIV International Conference on Photonic, Electronic, and Atomic Collisions*, eds. P. D. Fainstein, M. A. Lima, J. E. Miraglia, E. C. Montenegro, and R. D. Rivarola (World Scientific, Singapore, 2006), p. 522.
  40. “Cosmological Implications of the Uncertainty in Astrochemical Rate Coefficients”, S. C. O. Glover, **D. W. Savin**, and A.-K. Jappsen, in *Proceedings of the 2006 NASA Laboratory Astrophysics Workshop*, eds. P. F. Weck, V. H. S. Kwong, and F. Salama (NASA/CP-2006-214549, 2006), p. 248.
  39. “Dielectronic Recombination In Active Galactic Nuclei”, D. V. Lukić, M. Schnell, **D. W. Savin**, Z. Altun, N. R. Badnell, C. Brandau, E. W. Schmidt, A. Müller, S. Schippers, F. Sprenger, M. Lestinsky, and A. Wolf, in *Proceedings of the 2006 NASA Laboratory Astrophysics Workshop*, eds. P. F. Weck, V. H. S. Kwong, and F. Salama (NASA/CP-2006-214549, 2006), p. 221.
  38. “Calculation of Atomic Data for NASA Missions”, T. W. Gorczyca, K. T. Korista, J. Fu, D. Nikoli, M. F. Hasoglu, I. Dumitriu, N. R. Badnell, **D. W. Savin**, and S. T. Manson, in *Proceedings of the 2006 NASA Laboratory Astrophysics Workshop*, eds. P. F. Weck, V. H. S. Kwong, and F. Salama (NASA/CP-2006-214549, 2006), p. 190.
  38. “Collisional Ionization Equilibrium for Optically Thin Plasmas”, P. Bryans, W. Mitthumsiri, **D. W. Savin**, N. R. Badnell, T. Gorczyca, and J. M. Laming, in *Proceedings of the 2006 NASA Laboratory Astrophysics Workshop*, eds. P. F. Weck, V. H. S. Kwong, and F. Salama (NASA/CP-2006-214549, 2006), p. 166.
  37. “Laboratory Astrophysics White Paper”, N. Brickhouse, S. Federman, V. Kwong, F. Salama, D. Savin, P. Stancil, J. Weingartner, and L. Ziurys, in *Proceedings of the 2006 NASA Laboratory Astrophysics Workshop*, eds. P. F. Weck, V. H. S. Kwong, and F. Salama (NASA/CP-2006-214549, 2006), p. 1.
  36. “Ionization and Recombination with Electrons: Laboratory Measurements and Observational Consequences”, **D. W. Savin**, in *X-Ray Diagnostics of Astrophysical Plasmas*, ed. R. Smith (American Institute of Physics, New York), AIP Conf. Proc. **774**, 297 (2005).
  35. “Importance of M-shell Iron Dielectronic Recombination in Active Galactic Nuclei”, **D. W. Savin**, S. Böhm, C. Brandau, M. Lestinsky, A. Müller, S. Schippers, E. W. Schmidt, M. Schnell, F. Sprenger, and A. Wolf, *Energriereiche Atomare Stöße (Atomic Collision Dynamics)*, ed. Jan M Rost and J.Ullrich (Max Planck Institute for Physics of Complex Systems, Dresden, 2004).

34. “X-Ray Spectroscopy of Astrophysical Plasmas”, S. M. Kahn, E. Behar, A. Kinkhabwala, and **D. W. Savin** in *Frontiers of X-Ray Astronomy*, ed. A. C. Fabian, K. A. Pounds, R. D. Blandford (Cambridge University Press, Cambridge, 2004), p. 19.
33. “Recombination Rate Coefficients for Astrophysical Applications from Storage-Ring Experiments”, S. Schippers, S. Böhm, A. Müller, G. Gwinner, M. Schnell, D. Schwalm, A. Wolf, and **D. W. Savin**, in *Stellar Coronae in the Chandra and XMM-Newton Era*, ed. F. Favata and J. Drake, (Astronomical Society of the Pacific, Provo, Utah, 2002), p. 591.
32. “Ion Storage Ring Measurements of Low Temperature Dielectronic Recombination Rate Coefficients for Modeling X-Ray Photoionized Cosmic Plasmas”, **D. W. Savin**, G. Gwinner, D. Schwalm, A. Wolf, A. Müller, and S. Schippers, *NASA Laboratory Astrophysics Workshop*, ed. F. Salama (NASA/CP-2002-21186, 2002), p. 83.
31. “Laboratory Measurements of Charge Transfer on Atomic Hydrogen at Thermal Energies”, C. C. Havener, C. R. Vane, H. F. Krause, P. C. Stancil, T. Mroczkowski, and **D. W. Savin**, *NASA Laboratory Astrophysics Workshop*, ed. F. Salama (NASA/CP-2002-21186, 2002), p. 62.
30. “Computation of Dielectronic Recombination Data for the Oxygen-like Isoelectronic Sequence”, T. W. Gorczyca, K. T. Korista, O. Zatsarinny, N. R. Badnell, and **D. W. Savin**, *NASA Laboratory Astrophysics Workshop*, ed. F. Salama (NASA/CP-2002-21186, 2002), p. 60.
29. “X-Ray Spectroscopy of Astrophysical Plasmas”, S. M. Kahn, E. Behar, A. Kinkhabwala, and **D. W. Savin**, *Phil. Trans. R. Soc. London A* **360**, 1923 (2002).
28. “Dielectronic Recombination of *L*-Shell Ions”, G. Gwinner, **D. W. Savin**, D. Schwalm, A. Wolf, S. Schippers, A. Müller, N. R. Badnell, M. H. Chen, *Physica Scripta* **T92** 319, (2001).
27. “Spectroscopic Challenges of Photoionized Plasmas”, G. Ferland and **D. W. Savin**, *Publ. Astron. Soc. Pacific*, **113**, 1024 (2001).
26. “Current Research with Highly Charged Ions in EBIT and SuperEBIT”, P. Beiersdorfer, J. A. Britten, G. V. Brown, H. Chen, E. J. Clothiaux, J. Cottam, E. Förster, M.-F. Gu, C. L. Harris, S. M. Kahn, J. K. Lepson, P. A. Neill, **D. W. Savin**, H. Schulte-Schreppig, L. Schweikhard, A. J. Smith, E. Träbert, J. Tschischgale, S. B. Utter, and K. L. Wong, *Physica Scripta* **T92** 268 (2001).
25. “Measurements of Atomic Parameters of Highly Charged Ions for Interpreting Astrophysical Spectra”, G. V. Brown, P. Beiersdorfer, K. R. Boyce, K. C. Gendreau, M. F. Gu, J. Cygax, S. M. Kahn, R. Kelley, F. S. Porter, **D. W. Savin**, and S. B. Utter, *Physica Scripta* **T92**, 130 (2001).
24. “Dielectronic Recombination Rates for *L*-Shell Iron Ions (Fe XVII - Fe XXIV) in Collisionally Ionized Plasmas”, **D. W. Savin**, T. Bartsch, M. H. Chen, M. Grieser, T. W. Gorczyca, G. Gwinner, S. M. Kahn, J. Linkemann, A. Müller, R. Repnow, A. Saghiri, S. Schippers, M. Schmitt, D. Schwalm, and A. Wolf, in *New Century of X-Ray Astronomy*, ed. H. Kunieda and H. Inoue, (Astronomical Society of the Pacific, Provo, Utah, 2001), p. 272.
23. “Atomic Data Needs for Modeling Photoionized Plasmas”, **D. W. Savin**, in *Spectroscopic Challenges of Photoionized Plasmas*, ed. G. J. Ferland and **D. W. Savin**, (Astronomical Society of the Pacific, Provo, Utah, 2001), p. 167.

22. “Measurements of Low Temperature Dielectronic Recombination in *L*-Shell Iron for Modeling X-Ray Photoionized Cosmic Plasmas”, **D. W. Savin**, N. R. Badnell, T. Bartsch, E. Behar, C. Brandau, M. H. Chen, M. Grieser, T. W. Gorczyca, G. Gwinner, A. Hoffknecht, S. M. Kahn, A. Müller, R. Repnow, A. A. Saghiri, S. Schippers, M. Schmitt, D. Schwalm, A. Wolf, and P. A. Závodszky, in *Proceedings of the 12th APS Topical Conference on Atomic Processes in Plasmas, Reno, Nevada*, ed. R. C. Mancini and R. A. Phaneuf (American Institute of Physics, New York), AIP Conf. Proc. **547**, 267 (2000).
21. “Modeling X-Ray Photoionized Plasmas: Ion Storage Ring Measurements of Low Temperature Dielectronic Recombination Rate Coefficients for L-Shell Iron”, **D. W. Savin**, N. R. Badnell, T. Bartsch, C. Brandau, M. H. Chen, M. Grieser, G. Gwinner, A. Hoffknecht, S. M. Kahn, J. Linkemann, A. Müller, R. Repnow, A. A. Saghiri, S. Schippers, M. Schmitt, D. Schwalm, A. Wolf, and P. A. Závodszky, in *Atomic Data Needs for X-Ray Astronomy*, ed. M. A. Bautista, T. R. Kallman, and A. K. Pradhan (NASA/CP-2000-209968, 2000), p. 143.
20. “Laboratory Data for X-Ray Astronomy”, P. Beiersdorfer, G. V. Brown, H. Chen, M. F. Gu, S. M. Kahn, J. K. Lepson, **D. W. Savin**, and S. B. Utter, in *Atomic Data Needs for X-Ray Astronomy*, ed. M. A. Bautista, T. R. Kallman, and A. K. Pradhan (NASA/CP-2000-209968, 2000), p. 103.
19. “Emission Line Spectra from Low-Density Laboratory Plasmas”, P. Beiersdorfer, G. V. Brown, J. J. Drake, M.-F. Gu, S. M. Kahn, J. K. Lepson, D. A. Liedahl, C. W. Mauche, **D. W. Savin**, S. B. Utter, and B. J. Wargelin, *Rev. Mex. Astron. Astrofis. (Serie de Conferencias)* **9**, 123 (2000).
18. “Dielectronic Recombination: An Overview of Theory and Experiment and Some Astrophysical Implications”, **D. W. Savin**, *Rev. Mex. Astron. Astrofis. (Serie de Conferencias)* **9**, 115 (2000).
17. “Recombination in Electron Coolers”, A. Wolf, G. Gwinner, J. Linkemann, A. A. Saghiri, M. Schmitt, D. Schwalm, M. Grieser, M. Beuelpacher, T. Bartsch, C. Brandau, A. Hoffknecht, A. Müller, S. Schippers, O. Uwira, and **D. W. Savin**, *Nucl. Instrum. Methods* **A441**, 183 (2000).
16. “Dielectronic Recombination Rates for Iron L-Shell Ions from Storage Ring Experiments”, S. Schippers, N. R. Badnell, T. Bartsch, C. Brandau, M. H. Chen, M. Grieser, G. Gwinner, A. Hoffknecht, S. M. Kahn, J. Linkemann, A. Müller, R. Repnow, A. A. Saghiri, **D. W. Savin**, M. Schmitt, D. Schwalm, and A. Wolf, in *Proceedings of the International Seminar on Atomic Processes in Plasmas, Toki, Japan 1999*, ed. T. Kato and I. Murakami, National Institute for Fusion Science Research Report, NIFS-PROC-44, p. 122 (2000).
15. “Recent Livermore Excitation and Dielectronic Recombination Measurements for Laboratory and Astrophysical Spectral Modeling”, P. Beiersdorfer, G. V. Brown, M.-F. Gu, C. L. Harris, S. M. Kahn, S.-H. Kim, P. A. Neill, **D. W. Savin**, A. J. Smith, S. B. Utter, and K. L. Wong, in *Proceedings of the International Seminar on Atomic Processes in Plasmas, Toki, Japan 1999*, ed. T. Kato and I. Murakami, National Institute for Fusion Science Research Report, NIFS-PROC-44, p. 25 (2000).
14. “Ion Storage Ring Measurements of Dielectronic Recombination for Astrophysically Relevant  $\text{Fe}^{q+}$  Ions”, **D. W. Savin**, T. Bartsch, C. Brandau, M. H. Chen, M. Grieser, A. Hoffknecht, S. M. Kahn, J. Linkemann, A. Müller, R. Repnow, A. A. Saghiri, S. Schippers, M. Schmitt, D.



- Schwalm, and A. Wolf, in *Proceedings of the 15th International Conference on the Application of Accelerators in Research and Industry, Denton, Texas*, ed. J. L. Duggan and I. L. Morgan, (American Institute of Physics, New York), AIP Conf. Proc. **475**, 166 (1999).
13. "Simulations of a Maxwellian Plasma using an Electron Beam Ion Trap", **D. W. Savin**, B. Beck, P. Beiersdorfer, S. M. Kahn, G. V. Brown, M. F. Gu, D. A. Liedahl, and J. H. Scofield, *Physica Scripta* **T80B**, 312 (1999).
  12. "Laboratory Measurement of Resonant Contributions to Fe XXIV Line Emission", M. F. Gu, P. Beiersdorfer, G. V. Brown, S. M. Kahn, D. A. Liedahl, K. J. Reed, and **D. W. Savin**, *Physica Scripta* **T80B**, 310 (1999).
  11. "Recent Dielectronic Recombination Experiments", A. Müller, T. Bartsch, C. Brandau, A. Hoffknecht, H. Knopp, S. Schippers, O. Uwira, J. Linkemann, A. A. Saghiri, M. Schmitt, D. Schwalm, A. Wolf, F. Bosch, B. Franzke, C. Kozhuharov, P. H. Mokler, F. Nolden, M. Steck, T. Stöhlker, T. Winkler, H. Danared, D. R. DeWitt, H. Gao, H. Lebius, R. Schuch, W. Spies, W. Zong, G. H. Dunn, W. G. Graham, J. A. Tanis, J. Doerfert, **D. W. Savin**, and Z. Stachura, *Hyperf. Int.* **114**, 229 (1998).
  10. "The Effects of Electron Spiraling on the Anisotropy and Polarization of Photon Emission from an Electron Beam Ion Trap", **D. W. Savin**, M. F. Gu, and P. Beiersdorfer, in *Proceedings of the Japan-US Workshop on Plasma Polarization Spectroscopy and the International Seminar on Plasma Polarization Spectroscopy, Kyoto, Japan, 1998*, ed. T. Fujimoto and P. Beiersdorfer, National Institute for Fusion Science Research Report, NIFS-PROC-37, p. 90 (1998).
  9. "New Electron Temperature and Density Diagnostics for Photoionized Gas", **D. W. Savin**, S. M. Kahn, J. Linkemann, M. Schmitt, D. Schwalm, A. Wolf, T. Bartsch, A. Müller, S. Schippers, M. H. Chen, and D. A. Liedahl, in *NIST Special Publication 926, Poster Papers - International Conference on Atomic and Molecular Data and Their Applications (ICAM-DATA 97)*, ed. W. L. Wiese and P. J. Mohr (NIST, Gaithersburg, 1998), p. 96.
  8. "Laboratory Measurements of Iron *L*-Shell Line Emission", M. F. Gu, S. M. Kahn, **D. W. Savin**, P. Beiersdorfer, G. V. Brown, and D. A. Liedahl, in *NIST Special Publication 926, Poster Papers - International Conference on Atomic and Molecular Data and Their Applications (ICAM-DATA 97)*, ed. W. L. Wiese and P. J. Mohr (NIST, Gaithersburg, 1998), 137.
  7. "Hyperfine Transitions in Ground State Hydrogen-like  $^{165}\text{Ho}^{66+}$  and  $^{185,187}\text{Re}^{74+}$ ," J. R. Crespo López-Urrutia, P. Beiersdorfer, **D. W. Savin**, K. Widmann, *Proceedings of the 14th International Conference on the Application of Accelerators in Research and Industry, Denton, Texas*, ed. J. L. Duggan and I. L. Morgan (American Institute of Physics, New York), AIP Conf. Proc. **392**, 87 (1997).
  6. "Enhancement Effects on Electron-Ion Recombination Rates", A. Müller, T. Bartsch, C. Brandau, H. Danared, D. R. DeWitt, J. Doerfert, G. H. Dunn, H. Gao, W. G. Graham, A. Hoffknecht, H. Lebius, J. Linkemann, M. S. Pinzola, **D. W. Savin**, S. Schippers, M. Schmitt, R. Schuch, D. Schwalm, W. Spies, O. Uwira, A. Wolf, and W. Zong, in *Proceedings of the 14th International Conference on the Application of Accelerators in Research and Industry, Denton, Texas*, ed. J. L. Duggan and I. L. Morgan, (American Institute of Physics, New York), AIP Conf. Proc. **392**, 31 (1997).

5. “Recombination Measurements at Low Energies with Au<sup>49+,50+,51+</sup> at the TSR”, O. Uwira, A. Müller, J. Linkemann, T. Bartsch, C. Brandau, M. Schmitt, A. Wolf, D. Schwalm, R. Schuch, W. Zong, H. Lebius, W. G. Graham, J. Doerfert, and **D. W. Savin**, *Hyperf. Int.* **108**, 149 (1997).
4. “Overview of the Current Spectroscopy Effort on the Livermore Electron Beam Ion Traps”, P. Beiersdorfer, G. Brown, J. Crespo López-Urrutia, V. Decaux, S. R. Elliott, **D. Savin**, A. J. Smith, G. Stefanelli, K. Widmann, K. L. Wong, *Hyperf. Int.* **99**, 203 (1996).
3. “Laboratory Astrophysics: Measurements of  $n = n'$  to  $n = 2$  Line Emission in Fe<sup>16+</sup> to Fe<sup>23+</sup>”, **D. W. Savin**, P. Beiersdorfer, G. V. Brown, J. Crespo López-Urrutia, V. Decaux, S. M. Kahn, D. A. Liedahl, K. J. Reed, and K. Widmann, in *Proceedings of the 10th APS Topical Conference on Atomic Processes in Plasmas, San Francisco, California*, ed. A. L. Osterheld and W. H. Goldstein (American Institute of Physics, New York), AIP Conf. Proc. **381**, 39 (1996).
2. “Report on the Plasma Codes Workshop Meeting of the High Energy Astrophysics Division of the AAS: Napa Valley, California”, N. Brickhouse, R. Edgar, J. Kaastra, T. Kallman, D. Liedahl, K. Masai, B. Monsignori-Fossi, R. Petre, W. Sanders, **D. Savin**, and R. Stern, *Legacy* **6**, 4 (1995).
1. “Experiments on Electron Impact Excitation and Dielectronic Recombination at Harvard-Smithsonian”, L. D. Gardner, J. L. Kohl, **D. W. Savin**, and A. R. Young, *Journal de Physique* **50**, C1-405 (1989).

Resume Employment History Example #3: This is a very plain format, but if you're in a field like accounting, finance, sales, data entry, customer service, etc., it could be a good choice. They're going to interview you and hire you for your skills and what you've done for past employers, not for a fancy resume design, right? The best way to approach writing your resume employment history is to think of the employer. Look at their job description. What are their needs? What employment history is required for a green card application? When you apply for a green card through marriage, the U.S. government will want to know where you've worked for the past five years. If you're applying from abroad, that period generally expands to the past 10 years. Request Employment History from Social Security. You can receive a statement of your employment history from the Social Security Administration (SSA) by completing a "Request for Social Security Earnings Information" form. You can also reconstruct your employment history by contacting the human resources department of any of your former employers, if you're not certain about your start and end dates of employment. Employment history. The reason a hiring manager looks at your resume is to determine whether your skills and experience are a match for his open position. Where does he look on your resume? He looks at your Employment History to see if the skills and accomplishments you list show that you will be an ideal worker. In this lesson, you will learn which format is best for listing your employment history. Employment history helps employers understand and verify your employment background. Your entire work history is also useful when writing a resume because it helps you easily identify the most relevant experience for a given job application. Can employers verify your work history? Yes, employers can verify your work history by contacting the previous employers you list on your resume. Employers normally verify the dates of your previous employment, your job titles and your duties.