Gwen C. Rudie

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Research Interests

- The circumgalactic medium of high-redshift galaxies
- The physical properties of high-redshift galaxies: metallicities, star-formation rates, outflows
- Chemical evolution, metallicity indicators, and metal-poor systems
- The intergalactic medium as a tool for understanding galaxy evolution
- Optical and near-infrared spectroscopy

Professional Appointments

2015-present **Staff Astronomer**
The Observatories of the Carnegie Institution for Science

2013-2015 **Carnegie-Princeton Postdoctoral Fellow**
The Observatories of the Carnegie Institution for Science

Education

2009-2013 **California Institute of Technology**
Ph.D. in *Astrophysics* (June 14, 2013)
Thesis: *The Intergalactic and Circumgalactic Medium surrounding Star-Forming Galaxies at Redshifts 2<z<3*
Advisor: Prof. Charles Steidel

2007-2009 **California Institute of Technology**
M.S. in *Astrophysics* (June 12, 2009)

2003-2007 **Dartmouth College**
A.B. Summa cum Laude with High Honors in *Physics* (June 10, 2007)
with a Minor in *Astronomy*
Honors Thesis: *The Expansion Kinematics of the Remnants of Low-Mass, Core-Collapse Supernovae*
Advisor: Prof. Robert Fesen

HONORS AND AWARDS

Rodger Doxsey Travel Prize selected on the basis of "scientific merit of the dissertation research" The American Astronomical Society, 2013
John P. Huchra Departmental Citizenship Award, Caltech, 2011
Ray W. Smith Award for "contributions to the stature of the College"**,** Dartmouth College, 2007
Haseltine Chemistry-Physics Prize for the most promising undergraduate major**,** Dartmouth College, 2007
Phi Beta Kappa, Dartmouth College, 2007
Barry M. Goldwater Scholar, Barry M. Goldwater Scholarship and Excellence in Education Foundation, 2006
Francis L. Town Scientific Prize in Physics and Astronomy, Dartmouth College, 2005

STEWARDSHIP CONTRIBUTIONS AND PROFESSIONAL SERVICE

Co-Organizer of "Understanding Nebular Emission in High-Redshift Galaxies: Massive Stars, Chemical Abundances, and Photoionization Modeling", Carnegie Observatories, July 2015
Presentation for Pasadena STEM Career Day for Middle School Girls, Pasadena City College, April 11, 2015
Observatories Visit for Exceptional Pasadena High School Students, Carnegie Observatories, October 2014, March 2015
Public Lecture for the Carnegie Observatories' Open House, "Using Cosmic Flashlights to Unveil the Invisible", Carnegie Observatories, October 2014
Claremont-Carnegie Astrophysics Research Program Seminar, Carnegie Observatories, February 2014
Public Lecture for the 20th Anniversary of the W. M. Keck Observatory, "Observing the Epoch of Galaxy Formation", Caltech, March 7, 2013
Moderator for Astro-ph Morning Discussion, Caltech 2012
Co-Organizer of "The 2012 Transit of Venus @ Caltech", (Public outreach program attended by 1800 people), Caltech 2012
Graduate Admissions Committee, Caltech 2012
Graduate Student Representative to the Faculty, Caltech 2011-2012
Author and Designer of "California Institute of Technology: Astrophysics", 50 page recruitment brochure, Caltech, 2010
Founder and Leader of Women of Cahill, Astronomy Women's Group, Caltech, 2009-2011
Co-founder of Astro-ph Discussion at Caltech, 2008
Scientific Referee for MNRAS and ApJ

PUBLICLY AVAILABLE CODE

Keck/MOSFIRE Multi-Slit Mask Design Software (MAGMA), Coauthor
Keck/MOSFIRE Exposure Time Calculator (XTcalc), Author

Instrumentation Experience and Technical Capabilities

Keck/MOSFIRE Instrument Team Member
Keck/MOSFIRE Mask Design Software (MAGMA) Coauthor
Keck/MOSFIRE Exposure Time Calculator (XTcalc) Author

Invited Talks and Colloquia

Astronomy Colloquium, University of California Los Angeles, April 2015
Colloquium, Carnegie Observatories, March 2015
Astronomy Seminar, University of California Santa Barbara, January 2015
Physics Colloquium, University of California Santa Barbara, January 2015
Astronomy Colloquium, University of Chicago, January 2015
Bridging the Gap: Observations and Theory of Star Formation on Large and Small Scales
Keck Institute for Space Studies, Caltech, November 2014
CIERA Astrophysics Seminar, Northwestern University, November 2014
Physics and Astronomy Colloquium, Dartmouth College, February 2014
Munich Joint Astronomy Colloquium, Garching, November 2013
Galactic Winds Near and Far, Ringberg Castle, Germany, June 2013
Astrophysics Seminar, University of California, San Diego, April 2013
Astronomy Seminar, Texas A&M, March 2013
Astronomy Colloquium, University of Wisconsin, Madison, November 2012
Theoretical Astrophysics Center Seminar, University of California, Berkeley, September 2012
Astronomy Seminar; University of California, Riverside, May 2012

Conference and Symposia Presentations

Understanding Nebular Emission in High-Redshift Galaxies, Pasadena, CA, July 2015
The Physics of Accretion and Feedback in the Circumgalactic Medium, Aspen, CO, June 2015
Carnegie Science Day, Pasadena, CA, November 2014
Carnegie Science Day, Pasadena, CA, October 2013
2013 Pasadena Astronomy Postdoc Retreat, Lake Arrowhead, CA, April 2013
American Astronomical Society Meeting #221, Dissertation Talk, Long Beach, CA January 2013
Gas Flows in Galaxies; Baltimore, MD, May 2012
Keck Science Meeting; Pasadena, CA; September 2011
Galaxies in Absorption; Boulder, CO; September 2011
Galaxy Formation; Durham, UK; July 2011
Cosmic Odyssey of Baryons; Marseille, France; June 2011
Detecting Galaxies in Absorption; Marseille, France; June 2010
Circumstellar Media and Late Stages of Stellar Evolution; Ensenada, Mexico; September 2006

Poster Presentations

The Dynamic Nature of Baryons; Leiden, The Netherlands, August 2012
The Baryon Cycle; Irvine, California; June 2012
COSPAR; Bremen, Germany; July 2010
The Chemical Enrichment of the Intergalactic Medium; Leiden, The Netherlands, May 2009

Successful Observing Proposals

- Magellan Baade 6.5m telescope, Las Campanas, Chile (PI: 19 nights)
  - FourStar, FIRE
- Keck I 10m telescope, Mauna Kea, HI (CoI: 46+ nights)
  - MOSFIRE, LRIS, HIRES
- Hale 5m telescope, Palomar Mountain, CA (CoI: 10 nights)
  - TripleSpec
- Subaru 8.2m telescope, Mauna Kea, HI (CoI: 2 nights)
  - MOIRCS
- Michigan Dartmouth MIT 2.4m telescope, Kitt Peak, AZ (CoI: 10+ nights)
  - Optical Imaging and Spectroscopy
- Gemini South 8m telescope (Guest Observer, March 2006)

Memberships

American Astronomical Society, April 2006
Phi Beta Kappa, June 2007
Sigma Xi Scientific Honor Society, June 2007

First Author Refereed Publications

The Column Density Distribution and Continuum Opacity of the Intergalactic and Circumgalactic Medium at Redshift <z>=2.4
Rudie, G. C., Steidel, C., Shapley, A., & Pettini, M. 2013, *ApJ,* 769, 146

The Temperature-Density Relation in the Intergalactic Medium at Redshift <z>=2.4
Rudie, G. C., Steidel, C., & Pettini, M. 2012*, ApJL*, 757, L30

The Gaseous Environment of High-z Galaxies: Precision Measurements of Neutral Hydrogen in the Circumgalactic Medium of z ~ 2-3 Galaxies in the Keck Baryonic Structure Survey
Rudie, G. C., et al. 2012, *ApJ*, 750, 67

The Crab Nebula's Dynamical Age as Measured from its Northern Filamentary Jet
Rudie, G. C., Fesen, R., & Yamada, T. 2008, *MNRAS*, 384, 1200

Contributing Author Refereed Publications

The Spectroscopic Properties of Ly-Emitters and z~2.7: Escaping Gas and Photons from Faint Galaxies
Trainor, R. F., Steidel, C. C., Strom, A. L., Rudie, G. C., *Submitted to ApJ.*

Detection of Hot, Metal-Enriched Outflowing Gas around z~2.3 Star-Forming Galaxies in the Keck Baryonic Structure Survey
Turner, M., Schaye, J., Steidel, C., Rudie, G. C., Strom, A. 2015, *MNRAS*, 450, 2067

Contributing Author Refereed Publications (Continued)

Strong Nebular Line Ratios in the Spectra of z~2-3 Star-Forming Galaxies: First Results from KBSS-MOSFIRE
Steidel, C., Rudie, G. C., et al. 2014*, ApJ,* 795, 165

The Lyα Properties of Faint Galaxies at z~2-3 with Systematic Redshifts and Velocity Dispersions from Keck-MOSFIRE
Erb, D., et al. including G. C. R. 2014 *ApJ*, 795, 33

Metal-Line Absorption around z~2.4 Star-Forming Galaxies in the Keck Baryonic Structure Survey
Turner, M., Schaye, J., Steidel, C., Rudie, G. C., Strom, A. 2014*, MNRAS,* 445, 794

The Mass-Metallicity Relation of a z~2 Protocluster with MOSFIRE
Kulas, K. et al. including G. C. R. 2013, *ApJ*, 774, 130

A Measurement of the Galaxy Halo Mass from the surrounding HI Lyα Absorption
Rakic, O. et al. including G. C. R. 2013, *MNRAS,* 433, 3103

The Explosion Energy of Early Stellar Populations: the Fe-peak Element Ratios in Low-Metallicity Damped Lyα Systems
Cooke, R. et al. including G. C. R. 2013, *MNRAS,* 431, 1625

MOSFIRE, the Multi-Object Spectrometer for Infra-Red Exploration at the Keck Observatory
McLean, I. et al. including G. C. R., 2012*,* SPIE, Vol. 8446

Neutral Hydrogen Optical Depth near Star-Forming Galaxies at z ≈ 2.4 in the Keck Baryonic Structure Survey
Rakic, O., Schaye, J., Steidel, C., & Rudie, G. C. 2011, *ApJ*, 751, 94

The Most Metal-Poor Damped Lyα Systems: Insights into Chemical Evolution in the Very Metal-Poor Regime
Cooke, R., Pettini, M., Steidel, C., Rudie, G. C., Nissen, P. 2011, *MNRAS,* 417, 1534

Calibrating Galaxy Redshifts using Absorption by the surrounding Intergalactic Medium
Rakic, O., Schaye, J., Steidel, C., & Rudie, G. C. 2011, *MNRAS*, 414, 3265

A Carbon-Enhanced Metal-Poor Damped Lyα System: Probing Gas from Population III Nucleosynthesis?
Cooke, R., Pettini, M., Steidel, C., Rudie, G. C., Jorgenson, R. 2011, *MNRAS,* 412, 1047

A Newly Discovered DLA and Associated Lyα Emission in the Spectra of the Gravitationally Lensed Quasar UM673A,B
Cooke, R., Pettini, M., Steidel, C., King, L., Rudie, G. C., Rakic, O. 2010, *MNRAS,* 409, 679

Contributing Author Refereed Publications (Continued)

A Spectroscopic Search for Leaking Lyman Continuum at z~0.7
Bridge, C. et al. including G.C.R. 2010, *ApJ,* 720, 465

The Structure and Kinematics of the Circumgalactic Medium from Far-ultraviolet Spectra of z ~2-3 Galaxies
Steidel, C., et al. including G.C.R. 2010, *ApJ,* 717, 289

Optical Imaging and Spectroscopy of the Galactic Supernova Remnant 3C 58 (G130.7+3.1)
Fesen, R., Rudie, G., Hurford, A., & Soto, A. 2008, *ApJS,* 174, 379

Late-Time X-Ray, UV, and Optical Monitoring of Supernova 1979C
Immler, S. et al. including G.C.R. 2005, *ApJ*, 632, 283