

Brenda L. Frye – C. V.

Contact Information

Department of Astronomy/Steward Observatory
University of Arizona
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Research Interests

Observational Cosmology including (but not limited to): galaxy formation & evolution, gravitational lensing, intergalactic medium, high redshift galaxies, structure of the Milky Way, spectroscopy, and data analysis techniques

Chronology of Education

University of California at Berkeley, Ph. D., Astrophysics, May 1999,
Thesis: "A Faint Galaxy Redshift Survey behind Massive Clusters," Advisor: Prof. Hyron Spinrad

University of California at Berkeley, M. S., Astrophysics, May 1995

University of Arizona, B. S. Astronomy, B. S. Physics, *Magna cum Laude*, Dec 1991 Thesis: "MMT Absorption Spectroscopy towards High Redshift QSOs" Advisor: Prof. Jill Bechtold

Chronology of Employment

University of Arizona
Assistant Astronomer, Continuing-eligible status (Jan 2014 - present)
Assistant Astronomer & Lecturer (Jan 2011 - Dec 2013)

State University of New York at Stony Brook
Visiting Professor (Oct 2011- Dec 2011)

University of San Francisco (USF) Tenure-track Assistant Professor
Department of Physics & Astronomy (Sep 2009 - Sep 2011)

Dublin City University (DCU)
Fixed Term Lecturer (Jan 2005-Sept 2008) & **Research Fellow** (Oct 2008 - Aug 2009)
(Funded and supervised Ph. D. and undergraduate students, full teaching load, program development & service)

Princeton University
Council of Science & Technology Postdoctoral Fellow (Sept 2001 - Dec 2004) NSF
Astronomy & Astrophysics Postdoctoral Fellowship, (Sep 2001 - Aug 2004) with
Prof. Neta Bahcall

Lawrence Berkeley National Laboratory
Research Scientist, Supernova Cosmology Project, (May 1999 - Aug 2001) with
Prof. Saul Perlmutter

Selected Honors

NSF Astronomy & Astrophysics Postdoctoral Fellowship (2001-4)

& Awards	<p>(one of 15 fellowships awarded nationwide)</p> <p>Princeton Council of Science & Technology Postdoctoral Fellow (2001-5)</p> <p>(one of three fellowships awarded nationwide and across all science disciplines)</p> <p>Harvard Center for Astrophysics (CfA) Postdoctoral Fellowship (4 years, declined)</p> <p>NSF Graduate Research Fellow, 1992-5 (one of 15 fellowships awarded nationwide)</p> <p>with Profs. Jack Welch & Hyron Spinrad</p> <p>The Outstanding Senior Award, UA, (one over all College of Science), 1991</p> <p>The Outstanding Senior Award, UA, Astronomy Department, 1991</p> <p>George Gregson Departmental Scholarship, UA, 1990-1992</p> <p>Regents Academic Achievement Scholarship (full tuition waiver), UA, 1987-91</p> <p>John P. Schaefer Scholarship, UA, 1987-1991</p> <p>Glenn C. Purviance Scholarship, UA, 1987-1990</p>
Membership	<p>Dark Energy Science Instrument (DESI) science team member (Fall 2013 - present)</p>
	<p>LSST Team Member of 'Stars, Milky Way & Local Volume' & 'Galactic Bulge' subgroups, Spring 2013 - present</p>
	<p>JWST NIRCam Test Team Member, Summer 2012 - present</p>
	<p>SDSS-3 BOSS Team Member</p>
	<p>Dublin Institute for Advanced Study (DIAS) Research Associate, 2009 - present</p>
	<p>JWST MIRI Science & Test Team Members, European Consortium, 2007-2010</p>
	<p>HST ACS Science Team Member (adjunct since 2003 & full member 2008-9)</p>
Grants	<p>(1) Co-I Spitzer/GO-10014, "Spitzer unveils extreme Planck & Herschel lensed sources and their lenses," Cycle 10, 2014-16 (\$5000)</p> <p>(2) co-I HST/GO-13317, 'Infrared Grism Confirmation of a Strongly Lensed $z \sim 11$ Candidate: MACS0647-JD,' Cycle 21, 2013-15 (\$37,997)</p> <p>(3) co-I Spitzer-90111, 'Planck & Herschel unveil extreme submillimeter structures,' Cycle 9, 2013-15 (\$5,000)</p> <p>(4) co-I Spitzer-90195 'Constraining the stellar population of an unusually bright galaxy at $z > 5$,' Cycle 9, 2013-4 (unfunded)</p> <p>(5) co-I HST/GO-13411, 'Dissecting the intensely star-forming clumps in a $z \sim 2$ Einstein Ring,' Cycle 21, 2013-4 (unfunded)</p> <p>(6) PI, Commission on the Status of Women (CSW) Mini-Grant 2013 (\$642)</p> <p>(7) PI, International Research Development Grant (IRDG), Office of Global Initiatives, UA, 2013 (first research-track recipient in Astronomy) (\$800)</p> <p>(8) co-I HERSCHEL, 'Herschel Extreme Lensing Line Observations (HELLO),' OT2, 2012-13 (\$10,000)</p> <p>(9) co-I HST/GO-12988, 'Mapping Baryons in the Halo of NGC 1097,' Cycle 20, 2012-14 (unfunded)</p> <p>(10) PI, Initial Funds, UA Steward Observatory/Department of Astronomy, 2012-4 (\$12,375)</p> <p>(11) PI, USF Faculty Development Fund/Dean's Office 2010-11 (\$13,000)</p> <p>(12) PI Science Foundation Ireland Research Frontiers Grant, 2006-10 (one of 21 awarded over all disciplines of physics (\$130,000))</p> <p>(13) PI, DCU/ASU Strategic Alliance Grant, 2007-8 (\$4000)</p>
Observing Experience	<p><i>Extensive experience in optical, infrared & millimeter imaging and spectroscopy.</i></p> <p><i>PI/Major Participant in the following accepted proposals:</i></p> <p>Hubble Space Telescope: Cycle 21 (GO-13317, GO-13411), Cycle 20 (GO-12988), Cycles 10-15 (Advanced Camera for Surveys Science Team)</p> <p>Spitzer Space Telescope: Cycle 10 (GO-10014), Cycle 9 (GO-90111, GO-90195)</p> <p>Herschel Space Observatory: OT2</p> <p>ALMA: Co-I, DD Time 2013; Co-I, #1.01059.S, 2012</p>

Blanco Telescope (DECam): Community Time #N0719, 2013

Additional observing experience: ; Submillimeter Array (2013B-S050, A-rating);
Very Large Telescope: SINFONI, FORS, FORS2 Hawk1;

Keck Observatories: LRIS, ESI, DEIMOS;

Large Binocular Telescope; Subaru Observatory; MMT Observatory;

Institut de Radioastronomie Millimetrique IRAM (30m and Plateau de Bure)

Canada-France-Hawaii Telescope: Wircam; Apace Point Observatory

Courses

University of Arizona (UA):

Taught:

Astronomy 202: **Life in the Universe**, Spring, 2014 (second year course, 135 non-majors)
Lecture Hall *inside* Flandrau Planetarium dome, Laboratory assignments, term paper, and observing sessions
Astronomy 170B1: **The Physical Universe**, Fall, 2013 (118 non-majors) Nontraditional lecture format *inside* Flandrau Planetarium dome, Laboratory assignments, term paper, labs and observing sessions
Student Evaluations: **Overall performance (4.3); Mean for College of Science (4.0)**

Astronomy 170B1: **The Physical Universe**, Spring, 2013 (101 non-majors)
Laboratory assignments, term paper, and observing sessions
Student Evaluations: **Overall performance (4.1); Mean for College of Science (4.0)**

Astronomy 170B1: **The Physical Universe**, Fall, 2012 (135 non-majors) Laboratory assignments, term paper, and observing sessions

University of San Francisco (USF):

Physics 120: **Astronomy: from Earth to the Cosmos**, Spring 2011 (35 non-majors), Fall 2010 (120 non-majors), Spring 2010 (120 non-majors)
Supervise separate laboratory course and observing sessions

Physics 121: **Planetary Science**, Spring, 2011 (120 non-majors)
(supervise separate laboratory course and observing sessions)

Physics 350: **Colloquium Course**, Spring, 2011 (8 physics majors)

Dublin City University (DCU):

Physics 105: **Thermal Physics**, Spring, 2008 (12 physics majors)
Physics 310: **Astronomical Techniques**, Fall, 2007 (10 physics majors), Fall 2005 (8 physics majors)
Physics 153: **Physics Laboratory** (80 science majors)
(supervise five different experiments simultaneously and manage five teaching assistants)
Physics 123: **Electricity & Magnetism for Scientists**, Spring, 2006 (130 science majors)

Trinity College Dublin (TCD):

Physics 410: **Observational Cosmology**, Spring, 2006
(fourth year course for physics majors co-taught with Prof. Luke Drury)

Princeton University (Princeton):

AST 203: **The Universe**, Spring 2004 (assistant Lecturer with Profs. Michael Strauss, Rich Gott & Neil de Grasse Tyson)
AST 130: **Cosmology**, Fall 2002 (assistant Lecturer with Prof. Joe Patterson)
FRS 120: **Freshman Seminar, Astrobiology**, Fall, 2001 (assistant with Prof. Jill Knapp)

University of California at Berkeley (UCB):

AY 10: **General Astronomy**, Summer, 2000 (60 non-majors)

Advising of undergraduate and graduate students on research:

Name	Level	Position	Dates	Degree
Justin Spilker	Graduate, UA	Advising Committee	Fall, 2013–present	

Melissa Halford	Graduate, UA	Advising Committee	Spring, 2012–present	
Zheng Cai	Graduate, UA	Advising Committee	Spring, 2012–present	
Ken Wong	Graduate, UA	Advising Committee	Spring, 2011–Summer, 2013	Ph. D.
James Sainz	Undergraduate, USF	Advisor	Summer, 2010–Spring, 2011	B. S.
Mairead Hurley*	Graduate, DCU	PI, Advisor	Oct 2006–Jan 2011	Ph. D.
Amanda Ryan	Undergraduate, DCU	Advisor	Fall, 2006–Spring, 2007	B. S.
Conor Hickey	Undergraduate, DCU	Advisor	Fall, 2005–Spring, 2006	B. S.

* Thesis: "Spatially Resolved Spectroscopy of Faint Star Forming Galaxies & their Environments in the High Redshift Universe"

Recent Talks
& Colloquia

Invited Talk at the *Workshop on Detection of Galaxies in Absorption* on "The metallicity of gas in the local universe: the sightline towards Q1543+489," Dec 2-4, 2013, Marseille

LSST Workshop talk on "Long Duration Transients with LSST: Getting Acquainted with our Dim Neighbors," February 8, 2013, UA

Journal Club talk on 'Experimental Limits on Primordial Black Hole Dark Matter,' September 11, 2013, UA

Invited Talk at the STScI Workshop, *Cluster Lensing: Peering into the Past, Preparing for the Future*, on "Ordinary Star Forming Galaxies at $z \sim 5$ and their Environments in the Field of A1689," April 15-17, 2013, STScI

Galaxy Group Seminar on 'Rare Views of Ordinary Galaxies towards A1689' November 20, 2012, UA

CosmoClub Seminar on, "A Rare View of Ordinary Star Forming Galaxies at High Redshift," 2 May 2011, University of California at Santa Cruz

Astronomy Seminar, "Physical Conditions of High- z Star Forming Galaxies," 16 March 2011, State University of Stony Brook,

Cosmology in Northern California Conference on, IGM Overdensities toward Galaxies and QSOs, 10 Oct 2010, Berkeley, CA

Invited talk at the *Chicago-France Workshop on the Detection of Galaxies in Absorption, IGM Overdensities toward Galaxies*, 2 June 2010, Marseille, France

Invited talk: Astronomy Colloquium, "Primeval Galaxies Magnified by Gravitational Lensing," 20 November, 2009, Armagh Observatory, UK

Invited talk: Physics & Astronomy Colloquium, "Surprising Results on the Physical Conditions of Galaxies at Early Times," 4 February 2009, University of San Francisco

Astronomy Department Seminar, "The Black Lyman- α Forest: Gas-rich Large Scale Structure in the Proximity of Lyman-break Galaxies," 25 April 2008, Cornell University

Invited talk: Physics Colloquium on "The Kinematics, Dynamics, and Cosmic Structure surrounding Galaxies at Early Cosmic Times," 23 April 2008, Hobart & William Smith Colleges

Astronomy Department Seminar on "Observations of the Gas Reservoir around a Star Forming Galaxy at $z = 4.866$," 4 April 2008, U Mass Amherst

Physics Department Colloquium, on "Physical Processes in and around

“Primeval Galaxies,” 2 April 2008, University of Massachusetts at Dartmouth

Institute for Theory & Computation, “The Sextets and Trio: High Signal-to-Noise Spectroscopy of Strongly-lensed LBGs at $3 < z < 5$,” 31 March, 2008, Harvard

Center for Astrophysical Sciences Seminar, on “Strongly-lensed LBGs: Rare Views of the High Redshift Universe,” 11 March 2008, Johns Hopkins University

Aspen Center for Physics Winter Astrophysics Workshop, on “Spatially-resolved Spectroscopy of Strongly-lensed Ly-break Galaxies,” 13 February, 2008, Aspen, CO

Invited talk: Astronomy Department Colloquium, on “Properties of Strongly-lensed Ordinary Galaxies at High- z ,” 13 December, 2007, U. Michigan Ann Arbor

Invited talk: *JWST MIRI Science Team Meeting*, on “Physical Conditions in the Neutral ISM of LBGs with MIRI,” October 24-26, 2007, Heidelberg, MPIA

HST ACS Science Team Meeting, on “The Arclet Redshift Survey in the Field of Abell 1689,” September 17-20, 2007, Grand Tetons, Wyoming

Other talks include:

Physics Department Theory Seminar, Caltech, September 21, 2007

Friday Seminar Series, Arizona State University, August 31, 2007

Invited talk at “Searching for Strong Lenses,” June 14-15, 2007, Fermilab

Invited talk at HST ACS Science Team Meeting, March 20-24, 2006, Granada, Spain

Invited talk at Physics Colloquium, January 27, 2006, University College Cork, Ireland

ITC Seminar, Harvard University; Seminar, Princeton University;

Seminar, University of Wisconsin at Madison; Invited seminar, University of Colorado at Boulder; seminar, Lawrence Berkeley National Laboratory; Colloquium, Stanford University

Professional

Activities and Affiliations

Referee for ApJ, ApJL (2001 - present)

NSF External Proposal Reviewer in Extragalactic Astronomy and Cosmology (ongoing)

JWST NIRCam Test Team Member, Lockheed (Jun 2012–Jan 2013)

Panelist: HST Telescope Allocation Committee, Cycle 20 (2012) and Cycle 21 (2013)

Panelist referee: NSF Astronomy & Astrophysics Postdoctoral Fellowship (2011)

GALEX Telescope Allocation Committee (2009)

Panelist referee: NSF Astronomy & Astrophysics Grant (2003, 2007),

JWST MIRI Verification Module Test Member, Rutherford Appleton Laboratory (Sept 2008)

Co-founder, DCU Astrophysics Colloquium Series, with T. Downes (2005-9)

Plenary Speaker, “Science Foundation Ireland Science Summit,” (Nov 07)

Invited Speaker, “Irish National Strategy Day,” Royal Irish Academy (Jan 2006)

Conference Organiser, “A Radio Telescope for Ireland,” DCU (Dec 2005)

Conference Co-organiser, Astronomy Science Group of Ireland, DCU (Sept 2005)

Member: AAS, RAS

Service/

Graduate Student Selection Committee Member, UA (2013-14)

Outreach	<p>Organizer of the Steward Observatory Observer's Lunch, UA (2013-14)</p> <p>Co-PI & Co-Founder of the 'First Annual All Girls Science and Chess Festival.' at Flandrau Planetarium, with Chess Master Anjelina Belakovskaia (April 13, 2013)</p> <p>Graduate Student Selection Committee Member (2012-3)</p> <p>Undergraduate Honors Student Recruitment Committee Member (2012-13)</p> <p>Initiator & Organizer of the Playreading of Brecht's Galileo (Oct 2012)</p> <p>Speaker for The San Francisco Amateur Astronomers on "The Story of Gravitational Lensing," Randall Museum, San Francisco (May 18, 2011)</p> <p>Producer of biannual playreading of Brecht's Galileo, USF (Apr 2010 - May 2011)</p> <p>Speaker for the Admitted Student Visit Program on 'How the Milky Way Came to Be,' with a total 349 students (Apr 2010)</p> <p>Participant, "Hands On Universe" and "Universe Quest" outreach programs to girls from disadvantaged sectors of the San Francisco Bay Area (2010)</p> <p>Demonstrator, Science Day (Ireland's largest physics fair), RDS Ireland, (Jan 2006)</p> <p>Speaker at public talk, "The Observable Universe," Dunsink Observatory, Dublin (Nov 2005)</p> <p>Invited Speaker for three-part Public Lecture Series, "Physics of Time," Washington, D. C. for Princeton Alumni (May 2003)</p>
The Press	<p>Discovery Channel documentary entitled, 'How the Universe Ends,' as a part of the series, 'How the Universe Works,' to air 6/14</p> <p>Nova feature entitled, 'Runaway Universe,' 11/00</p> <p>Featured in Astronomy Magazine, 'Tiny Primeval Galaxies Packed a Wallop,' 4/99</p> <p>Science News, 'Cosmic Lenses Magnify Distant Galaxies,' 12/98</p> <p>New York Times, 'Young Astronomers Scan Night Sky & Help Wanted Ads,' by Malcolm W. Browne, "<i>At the age of 26, Brenda Frye, a Berkeley graduate student already seems assured of a career in the exclusive science of cutting-edge astronomy</i>" (2/97)</p>
Referees	<p>Professor Neta Bahcall, Princeton University, neta@astro.princeton.edu (609) 258-6065</p> <p>Professor Holland Ford, (HST ACS PI), The Johns Hopkins University, ford@pha.jhu.edu (410) 516-8653</p> <p>Professor Raja Guhathakurta, UC Santa Cruz, raja@ucolick.org (831) 459-5169</p> <p>Professor Priya Natarajan, Yale University, priyamvada.natarajan@yale.edu (203) 436-4833</p> <p>Professor Ed Prather, University of Arizona, eprather@as.arizona.edu (520) 621-6530</p> <p>Professor Tom Ray (co-I JWST MIRI), Dublin Institute for Advanced Study, tr@cp.dias.ie +353 1 440-6656</p> <p>Professor Rogier Windhorst, Arizona State University, rogier.windhorst@asu.edu, (480) 540-0816</p>

TEACHING EVALUATIONS

'Brenda has lots of energy and enthusiasm for the course the subject matter, so it radiates into her students. She is very well organized, like how she makes the syllabus available to students as a review of the course and how she uses audio-visual material in the class. She is great, and I wish her lots of luck in her career.'

'Her enthusiasm about the subject matter and honesty in wanting to see each student succeed made for an unparalleled learning environment.'

'Very well prepared. Enthusiastic! Puts in a lot of effort. Is able to explain the material well. Likes to teach! Is willing to answer all questions. Has a great attitude towards students. Gives a lot of assignments, which are carefully graded and is giving a lot of time to meet with students.'

'She exhibited a clear desire for us to pursue the subject matter. She was glad to answer questions, and extremely patient when we had a difficult time understanding. Her grading was very fair. She used a variety of methods to introduce material, which kept the class work fresh.'

'Willingness to use student input in class; great desire to be available and helpful attitude toward students; able to be consistent about the grading.'

'She consistently has a willingness to answer questions and a good attitude. She's available and she gives a fair chance to those who need partial credit. The labs were cool and interesting.'

'She always put a lot of effort into the lectures, course, course webpage, etc. Her enthusiasm for the material was evident and encouraging. Dr. Frye did a great deal to make herself accessible. I really appreciate her effort and eagerness to help out the students.'

'Dr. Frye was very knowledgeable and presented the material in a variety of ways (lecture, on-line website for class, etc.) She was very available for office hours for questions and advice. She was very supportive and helpful.'

'Well organized with good presentations, answered all questions, treated students equally and with respect. Available everyday in office hours.'

'Dr. Frye shows a great deal of interest in the subject matter. She is very willing to help her students understand the material. The assignments and examinations fairly cover the material covered in lecture as well as the assigned reading. Dr. Frye really helped me maintain a high level of interest throughout the course.'

'Very friendly, enthusiastic, open, willing to help, organized and prepared, honest and helpful. Assignments are good, grading is fine, and she is not condescending at all, which is terrific!'

'Very friendly and willing to answer questions; always available during office hours, very thorough grading, interesting content, and very well organized.'

'She seems always well-prepared for the lectures and uses a variety of methods to teach the material. She tries her best to answer students' questions. She gets along well with the students. The homework she assigns is relevant and a good predictor of what will be on examinations. She grades fairly and is willing to discuss the reasons why a specific grade was given.'

'Her lectures followed the organization of the book and that helped me follow along more easily. The content and presentations were rich and informative. She was willing to answer all questions even if they interrupted her lecture. She was nice to the students and her office hours were useful. The exams were a bit hard. Assignment load was acceptable.'

'The Instructor's strengths are enthusiasm for material, use of visual media to convey concepts, availability and usefulness in listening to students, helping students, and trying to help students to understand material. Instructor's attitude is also very open, modest, interested, and willing to help students learn the material.'

References

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- [2] J. Rhoads, S. Malhotra, S. Allam, C. Carilli, F. Combes, K. Finkelstein, S. Finkelstein, **B. Frye**, M. Gerin, M. Gladders, P. Guillard, N. Nesvadba, C. Papovich, J. Rigby, M. Shin, M. Spaans, M. Strauss, "Herschel Extreme Lensing Line Observations: Dynamics of two strong-lensed normal galaxies near redshift two," *submitted, ApJ*, 2013
- [3] **B. L. Frye**, M. Hurley, D. Bowen, G. Meurer, K. Sharon, A. Straughn, D. Coe, T. Broadhurst and P. Guhthakurta. Spatially-Resolved HST Grism Spectroscopy of a Lensed Emission Line Galaxy at $z \sim 1$, *ApJ*, 2012, 754, 17.
- [4] J. Merten, D. Coe, R. Dupke, R. Massey, **B. L. Frye**, F. Braglia, and Y. Jimenez, "Creation of cosmic structure in the complex galaxy cluster merger Abell 2744," *MNRAS*, 2011, 417, 333.
- [5] Y. Matsuda, J. Richard, I. Smail, N. Kashikawa, K. Shimasaku, **B. L. Frye**, T. Yamada, Y. Nakamura, T. Hayashino, and Fujii. A search for galaxies in and around an HI overdense region at $z = 5$ behind A1689, *MNRAS*, 2010, 403, 54.
- [6] W. Zheng, L. D. Bradley, R. J. Bouwens, H. C. Ford, G. D. Illingworth, N. Benítez, T. Broadhurst, **B. L. Frye**, L. Infante, M. J. Jee, and V. Motta. Three Bright Strongly Lensed Galaxies at Redshift $z \sim 6 - 7$ Discovered behind the Clusters A1703 and CL0024+16, *ApJ*, 2009, 697, 1907.
- [7] **B. L. Frye**, D. Bowen, M. Hurley, T. Tripp, X. Fan, B. Holden, P. Guhathakurta, D. Coe, T. Broadhurst, E. Egami, and G. Meylan. Observations of the Gas Reservoir around a Star Forming Galaxy in the Early Universe, *ApJL*, 2008, 685, 5
- [8] M. Kowalski, D. Rubin, G. Aldering, R. J. Agostinho, A. Amadon, R. Amanullah, C. Balland, K. Barbary,

G. Blanc, P. J. Challis, A. Conley, N. V. Covarrubias, K. S. Dawson, S. E. Deustua, R. Ellis, S. Fabbio, V. Fadeyev, X. Fan, B. Farris, G. Folatelli, **B. L. Frye**, G. Garavini, et al. Improved Cosmological Constraints from New, Old and Combined Supernova Datasets *ApJ*, 2008, 686, 749.

[9] L. D. Bradley, R. J. Bouwens, H. C. Ford, G. D. Illingworth, M. J. Jee, N. Benítez, M. Franx, **B. L. Frye**, L. Infante, V. Motta, P. Rosati, R. L. White, and W. Zheng. Discovery of a Very Bright Strongly-lensed Galaxy Candidate at $z=7.6$. *ApJ*, 2008, 678, 647.

[10] D. Coe, E. Fuselier, N. Benítez, T. Broadhurst, **B. Frye**, and H. Ford, Lensperfect: Gravitational Lens Massmap Reconstruction Yielding Exact Reproduction of All Multiple Images *ApJ*, 2008, 681, 814.

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[12] B. Aracil, T. M. Tripp, D. V. Bowen, J. X. Prochaska, H.-W. Chen, and **Frye, B. L.** High-metallicity, photoionized gas in intergalactic large-scale filaments. *MNRAS*, 367:139–155, March 2006.

[13] T. Broadhurst, N. Benítez, D. Coe, K. Sharon, K. Zekser, R. White, H. Ford, R. Bouwens, J. Blakeslee, M. Clampin, N. Cross, M. Franx, **Frye, B.**, G. Hartig, G. Illingworth, L. Infante, F. Menanteau, G. Meurer, M. Postman, D. R. Ardila, F. Bartko, R. A. Brown, C. J. Burrows, E. S. Cheng, P. D. Feldman, D. A. Golimowski, T. Goto, C. Gronwall, D. Herranz, B. Holden, N. Homeier, J. E. Krist, M. P. Lesser, A. R. Martel, G. K. Miley, P. Rosati, M. Sirianni, W. B. Sparks, S. Steindling, H. D. Tran, Z. I. Tsvetanov, and W. Zheng. Strong-Lensing Analysis of A1689 from Deep Advanced Camera Images. *ApJ*, 621:53–88, March 2005.

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