# SOPHIA R FLURY

Curriculum Vitae


University of Edinburgh
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## EDUCATION

| | | | |
|---|---|---|---|
| Ph.D. | Astronomy | 2024 | University of Massachusetts, Amherst, MA |
| | advisor: Anne Jaskot | | |
| | dissertation: "Clearing the Path to Cosmic Reionization" | | |
| M.S. | Astronomy | 2023 | University of Massachusetts, Amherst, MA |
| | advisor: Anne Jaskot | | |
| | thesis: "New Insights into Lyman Continuum Escape" | | |
| M.A. | Astronomy | 2018 | Wesleyan University, Middletown, CT |
| | advisor: Ed Moran | | |
| | thesis: "Unmixing and Diluting Emission-line Cocktails in the Local Universe" | | |
| B.S. (cum laude) | Physics (hons) | 2012 | Dickinson College, Carlisle, PA |
| | advisor: Catrina Hamilton, Margaret Trippe (UMD-CP) | | |
| | thesis: "X-ray and Optical Properties of *Swift*/BAT AGN" | | |

## RESEARCH APPOINTMENTS

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|---|---|---|
| University of Edinburgh | PostDoctoral Research Asst | 08/2024 - 07/2026 (exp) |
| UMass Amherst | NASA FINESST award | 09/2023 - 08/2024 |
| | *HST*/COS - LzLCS | 01/2020 - 09/2023 |
| Wellesley College | RSS Pipeline Developer | 09/2018 - 05/2019 |

## TEACHING APPOINTMENTS

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|---|---|---|
| UMass Amherst | ASTR 101: Intro Astronomy | 08/2019 - 12/2019 |
| Wesleyan University | ASTR 111: Dark Side of the Universe | 01/2017 - 05/2018 |
| | ASTR 211: Observational Astronomy Numerical Methods | 05/2018 - 08/2018 |
| Dickinson College | Undergraduate Lab Assistant | 08/2009 - 05/2012 |

## FUNDING, PROGRAMS, & AWARDS

| | | |
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| *JWST* GO 5554 (**PI Flury**) | 2024 | $ 250,000 |
| NASA/FINESST Grant (**FI Flury**) | 2023 | $ 100,000 |
| MSGC Fellowships | 2023 | $ 8,500 |

## CO-I PROGRAMS

*JWST*: GO 1869 (PI Schaerer), GO 5545 (PI Barufet)
*HST*: GO 17069 (PI Hayes), GO 17443 (PI Carr), GO 17220 (PI Heckman)

## RESEARCH SPECIALIZATION & INTERESTS

Multiwavelength spectroscopy — rest optical, UV, IR spectroscopic observations of galaxies
Galaxies — ionization, gas geometry, stellar populations, feedback and outflows, active galactic nuclei, chemical abundances, Lyman continuum escape
ISM gas — emission and absorption lines, outflow kinematics, excitation, nebular properties and diagnostics, geometry, ionization structure, BPT-style diagnostics
Stellar populations — ages, feedback, spectroscopic features, ionizing SEDs and ionizing photon budgets, synthetic stellar populations including BPASS and SB99
Extreme ionization sources — shocks, active galactic nuclei, UV excess, high ionization lines

## TECHNICAL SKILLS

Programming — python, R, C, C#, SQL, fortran; object-oriented, documentation (sphynx, markdown, HTML, CSS, etc), GitHub (github.com/sflury), PyPI
Science programming and data analysis — numerical methods, statistics (including multivariate methods, treatment of upper limits, faint/weak signals, and non-Gaussian variates), regression (including MCMC, TLS and EIV, proportional hazards, and generalized linear models), time series (including periodograms, FTs, spectrograms, wavelets, autocorrelations, entropy and complexity)
Software packages — OutLines (developer), PyNeb, MAPPINGS, CLOUDY, calcos, FaintCOS, emcee, numpy, scipy, matplotlib, astropy, pandas, survival, lifelines, tidyverse, lightkurve, XSPEC, sherpa, CIAO, vorbin, ppxf
Observing facilities — *HST*/COS, *JWST*/MIRI, WHT/WEAVE, VISTA/4MOST, Gemini/GMOS, Keck/HIRES, *XMM*/EPIC-pn, *Cassini*/RSR, *Voyager*/RSR
— IFU, long slit, echelle, fiber/aperture spectroscopy

## PROFESSIONAL ENGAGEMENT

| | | |
|---|---|---|
| Lyman Continuum Labyrinths | Spring 2025 | contributing talk |
| Oxford University | Spring 2025 | contributing talk |
| Cambridge University | Spring 2025 | journal club |
| WEAVE/4MOST Conference | Winter 2024 | contributing talk |
| SUPA Cormack Meeting | Winter 2024 | contributing talk |
| St. Andrews University | Fall 2024 | lunch talk |
| IfA - DAWN JWST Workshop | Summer 2024 | contributing talk |
| CAGN IV | Spring 2024 | contributing talk |
| STScI Spring Symposium | Spring 2024 | poster |
| STScI | Fall 2023 | journal club |
| Oxford University | Fall 2023 | journal club |
| University of Hull | Fall 2023 | journal club |
| University of Edinburgh IfA | Fall 2023 | coffee talk |
| IfA - DAWN JWST Workshop | Fall 2023 | contributing talk |
| University of Edinburgh IfA | Fall 2023 | journal club |
| Johns Hopkins University | Fall 2023 | coffee talk |

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| University Cidade de São Paulo | Summer 2023 | colloquium |
| UVGalaxies2023 | Summer 2023 | contributing talk |
| First Light with JWST | Spring 2023 | poster |
| Lyman Continuum Labyrinths | Spring 2023 | contributing talk |
| AAS Journal Author Series | Summer 2022 | interview |
| Sazerac SIP Early Galaxy Formation | Fall 2021 | contributing talk |
| Sazerac 2.0 | Summer 2021 | contributing talk |
| CAGN III | Spring 2021 | contributing talk |

## PROFESSIONAL SERVICE

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|---|---|---|
| UEdinburgh SOPA DEI | IfA Representative/Contributor | 2024 - present |
| HWO Working Groups | Contributing Scientist<br>iphotons, CGM/IGM, AGN, chemical evolution, stars and stellar pops | 2024 - present |
| 4MOST Working Groups | Contributing Scientist<br>pipeline dev | 2024-present |
| WHT TAC | Reviewer | 2024 |
| CAGN IV | SOC member | 2024 |
| A&A | Referee | 2023 - present |
| ApJ | Referee | 2022 - present |
| Wesleyan University | Bridge program mentor | 2021 - 2024 |
| LMT TAC | facilitator | 2021 |
| Wesleyan University | Public Observing | 2017 - 2018 |
| Macdonough Elem, CT | Planetarium Shows | 2017 |
| Wesleyan University | Public outreach talks | 2017 - 2018 |
| Dickinson College | Founded and ran public science outreach fair | 2010 - 2012 |

## PREVIOUS ADVISEES

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|---|---|---|
| Miriam Eleazer | Wesleyan University | Masters thesis, MA |
| Alaina Einsig | Wesleyan University | Masters thesis, MA |
| Murdo Livingston | University of Edinburgh | senior honors thesis |

## FIRST-AUTHOR PUBLICATIONS — 284 CITATIONS, * >100 citations, † mentee

**Flury, S. R.**, Jaskot, A. E., Saldana-Lopez, A. et al. 2024. *ApJS* submitted, under review. "The Low-Redshift Lyman Continuum Survey: The Roles of Stellar Feedback and ISM Geometry in LyC Escape" arXiv:2409.12118

**Flury, S. R.**, Arellano-Córdova, K. Z., Moran, E. C., & Einsig, A.† 2024. *MNRAS* submitted. "The Shocking Nitrogen Excess at High Redshift" arXiv:2412.06763

**Flury, S. R.**, Moran, E. C., & Eleazer, M.†, 2023, *MNRAS* 525, 4231. "Galactic Outflow Emission Line Profiles: Evidence for Dusty, Radiatively-Driven Ionized Winds in Mrk 462".

**Flury, S. R.***, Jaskot, A. E., Ferguson, H. C., et al. 2022, *ApJS*, 260, 1. "The Low-redshift Lyman Continuum Survey. I. New, Diverse Local Lyman Continuum Emitters".

**Flury, S. R.***, Jaskot, A. E., Ferguson, H. C., et al. 2022, *ApJ*, 930, 126. “The Low-redshift Lyman Continuum Survey. II. New Insights into LyC Diagnostics”.

**Flury, S. R.**, & Moran, E. C. 2020, *MNRAS*, 496, 2191. “Chemical abundances in active galaxies”.

**CO-AUTHOR PUBLICATIONS — 450 CITATIONS**

Amorín, R. O. , Rodríguez-Henríquez, M., Fernández, V., Vílchez, J. M., Marques-Chaves, R., Schaerer, D., Izotov, Y. I., Firpo, V., Guseva, N., Jaskot, A. E., Komarova, L., Muñoz-Vergara, D., Oey, M. S., Bait, O., Carr, C., Chisholm, J., Ferguson, H., **Flury, S. R.**, et al. 2024. *A&A* 682, 25. “Ubiquitous broad line emission and the relation between ionized gas outflows and Lyman continuum escape in Green Pea galaxies”.

Bait, O., Borthakur, S., Schaerer, D., Momjian, E., Sebastian, B., Saldana-Lopez, A., **Flury, S. R.**, et al. 2024, *A&A* 688, 198. “The Low-redshift Lyman Continuum Survey: Radio continuum properties of low- z Lyman continuum emitters”.

Dors, O. L., Cardaci, M. V., Hägele, G. F., Valerdi, M., Ilha, G. S., Oliveira, C. B., Riffel, R. A., **Flury, S. R.**, et al. *MNRAS* 534, 30. “Direct estimates of nitrogen abundance for Seyfert 2 nuclei”

Dors, O. L., Arellano-Cordova, K. Z., **Flury, S. R.**, et al. 2024. *MNRAS* 533, 1. “Empirical calibration for helium abundance determinations in Active Galactic Nuclei”

Duncan, K. J., McLeod, D. J., Best, P. N., Pirie, C. A., Clausen, M., Cochrane, R. K., Dunlop, J. S., **Flury, S. R.**, et al. *MNRAS* subm. “The JWST Emission Line Survey (JELS): Extending rest-optical narrow-band emission line selection into the Epoch of Reionization” 2024arXiv241009000D

Carr, C, Cen, R, Scarlata, C, Marques-Chaves, R, Chave, C, Xu, X, Amorin, R, Schaerer, D, Henry, A, **Flury, S. R.**, et al. 2024. *ApJ* subm. “The Impact of Massive Outflows on Lyman Continuum Escape from Local Starbursts” 2024arXiv240905180C

Chisholm, J., Berg, D. A., Endsley, R., Gazagnes, S., Richardson, C. T., Lambrides, E., Greene, J., Finkelstein, S., **Flury, S. R.**, et al. 2024. *MNRAS* 534, 26. “[Ne v] emission from a faint epoch of reionization-era galaxy: evidence for a narrow-line intermediate mass black hole”

Cullen, F., McLeod, D. J., McLure, R. J., Dunlop, J. S., Donnan, C. T., Carnall, A. C., Keating, L. C., Magee, D., Arellano-Cordova, K. Z., Bowler, R. A. A., Begley, R., **Flury, S. R.**, Hamadouche, M. L., and Stanton, T. M. 2024, *MNRAS* 531, 997. “Evidence for the emergence of dust-free stellar populations at z > 10”.

Gazagnes, S., Chisholm, J., Endsley, R., Berg, D. A., Leclercq, F., Jurlin, N., Saldana-Lopez, A., Finkelstein, S. L., **Flury, S. R.** et al. *MNRAS* submitted. “A negligible contribution of two luminous z~7.5 galaxies to the ionizing photon budget of reionization".

Heintz, K. E., Brammer, G. B., Watson, D., Oesch, P. A., Keating, L. C., Hayes, M. J., Abdurro'uf, Arellano-Córdova, K. Z., Carnall, A. C., Christiansen, C. R., Cullen, F., Davé, R., Dayal, P., Ferrara, A., Finlator, K., Fynbo, J. P. U., **Flury, S. R.**, et al. *A&A* submitted. “The JWST-PRIMAL Legacy Survey. A JWST/NIRSpec reference sample for the physical properties and Lyman-α absorption and emission of ~500 galaxies at z=5.5−13.4”.

Leclercq, F., Chisholm, J., King, W., Zeimann, G., Jaskot, A. E., Henry, A., Hayes, M., **Flury, S. R.**, et al. 2024. *A&A* 678, 73. "Linking Mg ii and [O ii] spatial distribution to ionizing photon escape in confirmed LyC leakers and non-leakers”.

Jaskot, A. E., Silveyra, A. C., Piantinga, A., **Flury, S. R.**, et al. 2024a. *ApJ* 972, 92. “Multivariate Predictors of LyC Escape I: A Survival Analysis of the Low-redshift Lyman Continuum Survey”

Jaskot, A. E., Silveyra, A. C., Piantinga, A., **Flury, S. R.**, et al. 2024b. *ApJ* 973, 111. “Multivariate Predictors of LyC Escape II: Predicting LyC Escape Fractions for High-Redshift Galaxies”

Jennings, R. M., Henry, A., Mauerhofer, V., Gazagnes, S., Heckman, T., Scarlata, C., Carr, C., Xu, X., Jaskot, A. E., Blaizot, J., Verhamme, A., **Flury, S. R.**, et al. 2024. *ApJ* accepted. "A Simulated Galaxy Laboratory: Exploring the Observational Effects on UV Spectral Absorption Line Measurements". 2024arXiv241202794J

Méndez-Delgado, J. E., Skillman, E. D., Aver, E., Morisset, C., Esteban, C., García-Rojas, J., Kreckel, K., Rogers, N. S. J., Rosales-Ortega, F. F., Arellano-Córdova, K. Z., **Flury, S. R.**, Reyes-Rodríguez, E., and Orte-García, M. *ApJ* under review. “Generalized T_e([OIII])-T_e(HeI) Discrepancies in Ionized Nebulae: Possible Evidence of Case B Deviations and Temperature Inhomogeneities”. 2024arXiv241017381M

Pirie, C. A., Best, P. N., Duncan, K. J., McLeod, D. J., Cochrane, R. K., Clausen, M., Dunlop, J. S., **Flury, S. R.**, et al. *MNRAS* subm. “The JWST Emission Line Survey (JELS): An untargeted search for Hα emission line galaxies at z>6 and their physical properties” 2024arXiv241011808P

Roy, N., Heckman, T., Henry, A., Chisholm, J, **Flury, S. R.**, et al. *ApJ* subm. “Lyman Continuum leakage from massive leaky starbursts: A different class of emitters?” 2024arXiv241013254R

Dors, O. L. , Valerdi, M., Riffel, R. A., Riffel, R., Cardaci, M. V., Hägele, G. F., Armah, M., Revalski, M., **Flury, S. R.**, Freitas-Lemes, P., Amôres, E. B., Krabbe, A. C., Binette, L., Feltre, A., 2023, *MNRAS*, 521, 1969. “Chemical abundances in Seyfert galaxies – X. Sulfur abundance estimates”.

French, R. G., Nicholson, P. D., McGhee-French, C. A., Longaretti, P.-Y., Hedman, M. M., Colwell, J., Marouf, E. A., Rappaport, N., **Flury, S. R.**, et al. 2023, Icarus 405, 115678. “The complex shape of the outer edge of Saturn's B ring, as observed in Cassini occultation data”.

Trebitsch, M., Dayal, P., Chisholm, J., Finkelstein, S. L., Jaskot, A., **Flury, S. R.**, et al. 2023, *A&A*L submitted. “Reionization with star-forming galaxies: insights from the Low-z Lyman Continuum Survey”.

Nicholson, P. D., French, R. G., McGhee-French, C. A., Longaretti, P.-Y., Hedman, M., El Moutamid, M., Colwell, J., Marouf, E. A., Rappaport, N., **Flury, S. R.**, et al. 2023, Icarus, 390, 115287. “The seven-lobed shape of the outer edge of Saturn's A ring”.

Chisholm, J., Saldana-Lopez, A., **Flury, S. R.**, et al. 2022, *MNRAS*, 517, 5104. “The far-ultraviolet continuum slope as a Lyman Continuum escape estimator at high redshift”.

Marques-Chaves, R., Schaerer, D., Amorin, R. O., Borthakur, S., Chisholm, J, Ferguson, H., **Flury, S. R.**, et al. 2022, *A&A*, 663, L1. “No correlation of the Lyman continuum escape fraction with spectral hardness”.

Saldana-Lopez, A., Schaerer, D., Chisholm, J., **Flury, S. R.**, et al. 2022, *A&A*, 663, A59. “The Low-Redshift Lyman Continuum Survey. Unveiling the ISM properties of low-z Lyman-continuum emitters”.

Xu, X., Henry, A., Heckman, T., Chisholm, J., Worseck, G., Gronke, M., Jaskot, A., McCandliss, S. R., **Flury, S. R.**, et al. 2022, *ApJ*, 933, 202. “Tracing Lyα and LyC Escape in Galaxies with Mg II Emission”.

Wang, B., Heckman, T. M., Amorín, R., Borthakur, S., Chisholm, J., Ferguson, H., **Flury, S. R.**, et al. 2021, *ApJ*, 916, 3. “The Low-redshift Lyman-continuum Survey: [S II] Deficiency and the Leakage of Ionizing Radiation”.