AKSHATHA K VYDULA

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Department of Physics, Gottwald Center for the Sciences: 138 UR Dr Richmond VA 23173

Professional Experience

Postdoctoral Research Associate — University of Richmond
September 2025 – Present

Graduate Research Associate — Arizona State University
August 2020 – July 2025

Graduate Research Assistant — Los Alamos National Laboratory
May – July: 2021, 2022, 2023

Undergraduate Research Fellow — University of Groningen, Netherlands
January – May 2020

Indian Academy of Sciences Fellow — Raman Research Institute, India
June – July: 2018, 2019

Research Interests

Computational Astronomy, Dark Ages, Cosmic Dawn, Epoch of Reionization, Data analysis and instrumentation, Planetary science neutron spectroscopy

Education

Ph.D., Astrophysics (2025)
School of Earth and Space Exploration, Arizona State University, Tempe AZ, USA
Thesis: Exploring the Fundamental Physics of the Universe Across Dynamic Scales

B.Engineering, Electronics and Communication (2020)
RV College of Engineering, Bengaluru KA, India

Publications

1. **Vydula, A.K.,** Bowman, J.D., Lewis, D., Crawford, K., Kolopanis, M., Rogers, A.E., Murray, S.G., Mahesh, N., Monsalve, R.A., Sims, P. and Samson, T., (2023). *Low-frequency Radio Recombination Lines Away from the Inner Galactic Plane.* The Astronomical Journal, 167(1), p.2 https://doi.org/10.3847/1538-3881/ad08ba
2. **Vydula, A.K.,** Coupland, D., Mesick, K. and Hardgrove, C., 2025. *Systematic uncertainties in the measurement of the neutron lifetime using the Lunar Prospector neutron spectrometer.* Physical Review C, 112(1), p.015807 https://doi.org/10.1103/q8jf-dc9b1
3. Sims, P. H., Bowman, J. D., Mahesh, N., Murray, S. G., Barrett, J. P., Cappallo, R., **Vydula, A. K.** (2022). *A Bayesian approach to modelling spectrometer data chromaticity corrected using beam factors–I. Mathematical formalism.* https://doi.org/10.1093/mnras/stad610
4. Murray, S.G., Bowman, J.D., Sims, P.H., Mahesh, N., Rogers, A.E., Monsalve, R.A., Samson, T. and **Vydula, A.K.**, 2022. *A Bayesian Calibration Framework for EDGES.* https://doi.org/10.1093/mnras/stac2600

5. Sims, P. H., Bowman, J. D., Mahesh, N., Murray, S. G., Barrett, J. P., Cappallo, R., **Vydula, A. K.** *A general Bayesian model-validation framework based on null-test evidence ratios, with an example application to global 21-cm cosmology* (2025) https://doi.org/10.1093/mnras/staf1109

6. Sims, P. H., Bowman, J. D., Murray, S. G., Barrett, J. P., Cappallo, R. C., Lonsdale, C. J., Monsalve, R.A., Rogers, A.E.E., Samson, T., **Vydula, A. K.** (2025). A Bayesian approach to modelling spectrometer data chromaticity corrected using beam factors-II. Model priors and posterior odds. Monthly Notices of the Royal Astronomical Society, staf1767 https://doi.org/10.1093/mnras/staf1767

7. Cappallo, R.C., Rogers, A.E., Lonsdale, C.J., Bowman, J.D., Barrett, J.P., Murray, S.G., Mahesh, N., Sims, P., **Vydula, A.K.**, Monsalve, R.A. and Eckert, C.J., 2025. *EDGES-3: Instrument Design and Commissioning* (2025). arXiv preprint https://arxiv.org/abs/2508.02577

8. Kosogorov, N., OVRO-LWA Collaboration, (including **Vydula, A.K.**), *Implementing Continuous All-Sky Monitoring with the OVRO-LWA to Identify Prompt and Precursor Counterparts of Gravitational Wave Events (2025)* https://doi.org/10.3847/1538-4357/add014

9. Zhang, P., OVRO-LWA Collaboration, (including **Vydula, A.K.**), *Probing the Turbulent Corona and Heliosphere Using Radio Spectral Imaging Observation during the Solar Conjunction of Crab Nebula* (2025) https://doi.org/10.3847/1538-4357/adff56

Technical Memos

1. EVLA Memo #228, LoCo Memo #52: VLA 4-band Beam Width Measurement Using the Holography Observing Mode
2. Loco Memo #51 Observing Campaign for LWA Beam measurements
3. LoCo Memo #50 Sensitivity analysis of pulsar beam mapping with the LWA and VLA
4. LoCo Memo #49 Beam Mapping of LWA using Pulsar Gating
5. LoCo EDGES Memo #200: Bench tests for EDGES-3 Ground Plane Resonance
6. LoCo EDGES Memo #201: Ground Plane Resonance testing at the EDGES WA site
7. LoCo EDGES Memo #202: EDGES WA Site Trip Summary Feb 2024
8. LoCo EDGES Memo #203: Updates on `edges` software suite for EDGES-3 data analysis
9. LoCo EDGES Memo #204: Investigation of reflections in long cable calibration source in EDGES absolute calibration design
10. LoCo EDGES Memo #206: Validation of edges-cal using simulated sky signal
11. LoCo EDGES Memo #209: Study of Antenna S11 Variability in EDGES-3

Invited Talks

1. Radio Astronomy techniques to measure the Global 21cm signal from the early Universe **Karnataka Physics Teachers Association** (Nov 24, 2024)
2. Space Archaeology : Studying early Universe using remote radio telescopes at **San Jose Astronomy Association** (Oct 19, 2024)
3. A Day in a life of a Radio Astronomer at **RV College of Engineering** (Oct 15, 2024)

4. Studying Cosmic Dawn using remote Radio telescopes at **Gulbarga Science Center, India** (Oct 8, 2024)
5. Low Frequency Radio Recombination Lines with EDGES at **LuSEE-Night Seminar** Brookhaven National Laboratory Long Island, NY (Nov 9, 2023)
6. Space Archaeology: Using 21cm signal to study the early Universe at **Annular Solar Eclipse 2023 county science outreach**, Kanab Utah (Oct 14, 2023)
7. Using MCNP to measure the Neutron Lifetime in Planetary Environment at **MCNP User Symposium, 2022**, Los Alamos National Laboratory (Oct 20, 2022)
8. Studying Early Universe as an Engineer turned Radio Astronomer at the **Cosmic Chronicles talk series**, RV College of Engineering, India (Sep 6, 2022)
9. Studying Early Universe using Low Frequency Radio Telescopes at **Grad-to-Grad Colloquium**, Dept. of Physics, ASU (Apr 29, 2022)
10. Transition from Engineering to Astrophysics at **National Space Society-USA, Mumbai** (Jan 24, 2022)

Talks

1. What does the radio sky tell us about the Universe? **Physics Seminar, University of Richmond, VA** (Oct 2025)
2. Preliminary EDGES-3 Science Analysis **8th Global 21cm Workshop, California Institute of Technology, Pasadena, CA** (Sep 2025)
3. Validation of EDGES software suite using 10 days of EDGES-3 data **2025 National Radio Science Meeting, Boulder, CO** (Jan 2025)
4. Progress on EDGES-3 Data analysis at **7th Global 21cm Workshop, Raman Research Institute, Bengaluru** (Oct 2024)
5. Low frequency science: Radio Recombination lines and Beam holography at **Caltech Lunch Seminar** (July 9, 2024)
6. Beam Mapping of VLA 4-band using dish holography **SESE Annual Symposium** (Aug 2023)
7. Beam Mapping of LWA using Pulsar Holography **38th Annual New Mexico Symposium** (Feb 2023)
8. Low-Frequency Radio Recombination Lines Away From the Inner Galactic Plane at **241st AAS Winter Meeting, Seattle WA** (Jan 2023)
9. Low-Frequency Radio Recombination Lines using EDGES at **5th Global 21cm Workshop, UC Berkeley** (Oct 2022)
10. Effects of surface temperature and compositions on the measurement of Neutron lifetime at **Space Science and Applications (ISR-1) Seminar, LANL** (Jul 19, 2022)
11. Measurement of Neutron lifetime using Space based Neutron Spectrometer at **LANL Summer Symposium (Aug 3-4, 2021)**.
12. Measurement of Neutron lifetime using Space based Neutron Spectrometer at **SESE Annual Symposium (Aug 18, 2021)**.

Awards

1. Recipient of 2025 ASU Graduate Academic Excellence Award
2. Recipient of 2025 Bharat Gaurav Puraskar (35 under 35 NRI Achievers), presented by Department of Education, Govt. of India.
3. Graduate Student Government travel award ($1600, 2024-2025 academic year)
4. ComSciCon 2024 Fellow: Offered to 50 out of 800-1200 applicants each year (+ $1500 travel award to attend the Annual Flagship workshop in Boston, MA)
5. National Academies 2025 Travel Fellowship Award to attend NRSM-URSI Meeting in Boulder, CO
6. SESE Student Award: Dept award covering part of tuition (Fall 2020, Summer 2021)
7. 2020 Best Outgoing student of RV College of Engineering
8. 2019 IIE WeTech Goldman Sachs Scholar (offered to only 45 female students/year in STEM fields across India)

Voluteering

1. ASU Sundial Mentor - designed one week program with a focus on exoplanets for early start freshman undergrads majoring in Physics, Astrophysics and Mathematics.
2. SESE Outreach coordinator: Outreach representative of Low-Frequency Cosmology Lab
3. Organized bi-weekly Astrophysics Journal Club for graduate students at SESE (2021-2022)
4. Co-Founder of dhRuVa, Astrophysics Club of R V College of Engineering (2018).
5. Chair of IEEE Student chapter of RV College of Engineering in 2019.
6. Editor of bi-annual newsletter of RV College of Engineering (Jan-2018 to Dec-2019)