

AKSHATHA K VYDULA

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School of Earth and Space Exploration: 781 Terrace Mall Tempe, Arizona 85281

EDUCATION

Arizona State University, Tempe-AZ, USA

Ph.D., Astrophysics

School of Earth and Space Exploration

August 2020 - Present

Cumulative GPA: 4.00/4.00

RV College of Engineering, Bengaluru-KA, India

B.Engineering

Department of Electronics and Communication

2016-2020

GPA 9.65/10.00

RESEARCH INTERESTS

Computational Astronomy, Epoch of Reionization, High redshift radio astronomy, Data analysis and instrumentation, Planetary science neutron spectroscopy

RESEARCH EXPERIENCE

Graduate Research Associate

Arizona State University (Aug 2020-present)

Advisors: Prof. Judd Bowman and Prof. Danny Jacobs

I work at the Low Frequency Cosmology lab, focusing on radio astronomical data analysis for detecting signal from Epoch of Reionization, mainly using [EDGES](#) and [OVRO-LWA](#).

Graduate Research Assistant

Los Alamos National Laboratory (May 2021-present)

Advisor: Dr. Daniel Coupland

Collaborators: Dr. Katherine Mesick, Dr. Brain Weaver & Prof. Craig Hardgrove

I work on simulations and numerical modelling for measurement of Neutron lifetime using space-based neutron spectrometer, on-board Lunar Prospector.

Undergrad Research Fellow University of Groningen, Netherlands (Jan 2020 - May 2020)

Advisors: Prof. Leon Koopmans & Prof. Harish Vedantham

I developed a pipeline for the analysis and detection of radio recombination lines using very high spectral resolution observations from LOFAR EoR fields around North Celestial Pole.

Indian Academy of Sciences Fellow

Raman Research Institute, India (Jun-Jul 2018,

Jun-July 2019) Advisors: Prof. Udaya Shankar & Prof. Ravi Subramaniam

I used wavelet transforms to check the presence of [EDGES](#) absorption feature in [SARAS](#) data.

PUBLICATIONS

1. **A.K. Vydula**, J.D. Bowman, D. Lewis, K.Crawford, M. Kolopanis, A.E.E. Rogers, S.G. Murray, N. Mahesh, R.A. Monsalve and P.Sims (2023) *Low-Frequency Radio Recombination Lines Away From the Inner Galactic Plane* <https://doi.org/10.3847/1538-3881/ad08ba>
2. **A.K. Vydula**, D.D.S. Coupland, K.E. Mesick, B. Weaver, C. Hardgrove *Effects of sub-surface temperature and surface compositions on the measurement of neutron lifetime using a space-based neutron spectrometer (in prep.)*
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>

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 (in prep): Updates on `edges` software suite for EDGES-3 data analysis
9. LoCo EDGES Memo #204 (in prep): Investigation of reflections in long cable calibration source in EDGES absolute calibration design

INVITED TALKS

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

TALKS

1. Beam Mapping of VLA 4-band using dish holography **SESE Annual Symposium** (Aug 2023)
2. Beam Mapping of LWA using Pulsar Holography **38th Annual New Mexico Symposium** (Feb 2023)
3. Low-Frequency Radio Recombination Lines Away From the Inner Galactic Plane at **241st AAS Winter Meeting, Seattle WA** (Jan 2023)
4. Low-Frequency Radio Recombination Lines using EDGES at **5th Global 21cm Workshop, UC Berkeley** (Oct 2022)

5. Effects of surface temperature and compositions on the measurement of Neutron lifetime at **Space Science and Applications (ISR-1) Seminar, LANL** (Jul 19, 2022)
6. Measurement of Neutron lifetime using Space based Neutron Spectrometer at **LANL Summer Symposium (Aug 3-4, 2021)**.
7. Measurement of Neutron lifetime using Space based Neutron Spectrometer at **SESE Annual Symposium (Aug 18, 2021)**.

RELEVANT EXPERIENCES & ACHIEVEMENTS

- Chambliss judge at 241st AAS Winter meeting Seattle WA (Jan 2023).
- 2020 Best Outgoing student of RV College of Engineering
- IIE WeTech Goldman Sachs Scholar 2019
- SESE Outreach coordinator: Outreach representative of Low-Frequency Cosmology Lab
- ASU Sundial Mentor
- Organized bi-weekly Astrophysics Journal Club for graduate students at SESE (2021-2022)
- Co-Founder of dhRuVa, Astrophysics Club of R V College of Engineering (2018).
- Chair of IEEE Student chapter of RV College of Engineering in 2019.
- Secured 78th rank in the State level Common Entrance test of Karnataka (K-CET, 2016, taken by 0.5 million students annually).