

Amisha Rane

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Location:
764 Deans Row Avenue
Norman, Oklahoma, USA.

EDUCATION

PhD. in Astrophysics <i>University of Oklahoma, Norman, Oklahoma.</i>	Aug 2024 – Present
Master of Science in Physics <i>Western Illinois University, Macomb, Illinois.</i> Concentrations: Observational Radio Astronomy Research supervisor: Dr. Esteban Araya	Aug 2022 – July 2024 CGPA: 4.0/4.0
P.G. Diploma in Computer Science and Applications <i>S.N.D.T Women's University, Mumbai, India.</i>	Aug 2021 – Aug 2022 CGPA: 9.91/10
Bachelor of Science in Physics <i>Ramnarain Ruia, Mumbai, India.</i>	May 2018 – May 2021 CGPA: 9.89/10

RESEARCH EXPERIENCE

Research Assistant, Department of Physics, Western Illinois University	Aug 2022 – Aug 2024
<ul style="list-style-type: none">• Conducting independent research focused on investigating the dynamics of molecular gas associated with jets and outflows in high-mass star forming regions.• Providing assistance to undergraduate students of the Astrolab at Western Illinois University in their research endeavors.• Conducting various Outreach activities in Astrolab.	
Master's Thesis	
<ul style="list-style-type: none">• Dissertation Title: High-Spectral Resolution Observations of Molecular Lines Detected in a Broadband VLA Survey.• Dissertation advisor : Dr. Esteban Araya.	

TEACHING EXPERIENCE

Graduate Teaching Assistant, Department of Physics and Astronomy	Aug 2024 – Present
<ul style="list-style-type: none">• Conducting discussion sections for the course Astr 1504-020.• Host of Star Party events conducted every week by Department of Physics and Astronomy, University of Oklahoma.	

STUDENTS MENTORED

- * Mentored high school student Cade Rigg for his research project 'Kinematics of Ionized Gas in an OH Outflow Source' and poster presentation of the same title.
- * Mentored high school students Elsa Torres and Maneth Perera for their research project 'Investigating Consistencies of Hydroxyl Masers in the Orion Nebula' and 'Investigating Flux Density of Methanol Masers in the Orion Nebula' as a part of their IMSA internship.

PUBLICATIONS

REPORTS PUBLISHED

- **ngVLA Science - Molecular Gas at the Core of Ionized Jets** 14th December, 2023

Esteban Araya, Emmanuel Sanchez-Tovar & Amisha Rane

(Western Illinois University)

Publisher: NRAO Newsletter

Webpage: <https://science.nrao.edu/enews/16.12/>

NASA ADS

- **243rd American Astronomical Society Meeting (AAS)** January 12th, 2024

Nature of Methanol and Ammonia Lines Detected in VLA
Broad-Band Continuum Observations towards Ionized-Jet Candidates

(Poster Presentation)

Publisher: Smithsonian Institution, NASA

Webpage: <https://ui.adsabs.harvard.edu/abs/2024AAS...24340216R/abstract>

- **244th American Astronomical Society Meeting (AAS)** June 12th, 2024

Testing Non-LTE Codes to Model Methanol
Observations of Ionized Jets in High-Mass Star Forming Regions

(Poster Presentation)

Publisher: Smithsonian Institution, NASA

Webpage: <https://ui.adsabs.harvard.edu/abs/2024AAS...24430209P/abstract>

PROFESSIONAL MEMBERSHIPS

American Astronomical Society: Graduate Student Member, 2023.
American Physical Society: Graduate Student, 2023.
Physics Club, Western Illinois University: Vice President, 2023-24.

GRADUATE RESEARCH PROJECT

Nature of Spectral Lines Detected in Broadband VLA Continuum Observations

Our group at Astrolab has been working on the project '**JOURNEY**' (Jets and Outflows Revealing the Nature and Evolution of massive YSOs) with a goal to comprehend the molecular outflows during formation of high mass stars using observational probes by conducting observations at radio frequencies. We work on data from the **Very Large Array (VLA)** in New Mexico. In this project, we conducted follow-up observations of (Sanchez-Tovar et al. 2023) involving three high mass star forming regions to investigate the nature of CH₃ OH and NH₃ emissions in young high-mass stellar objects and analyzed the dynamics of the molecular outflows.

UNDERGRADUATE RESEARCH PROJECT

Gravitational waves and LIGO, Ramnarain Ruia

Project objective was to create a miniature model of real life Laser Interferometer Gravitational Wave Observatory and also simulate gravitational waves through the project model.

Studies of DMS and RKKY interactions for Spintronics Application, Ramnarain Ruia

Conducted literature review of the overall behavior of semiconductors and determined the potential applications of semiconductors as DMS in Spintronics after analyzing RKKY interactions under research supervisor Dr. Nana Pradhan.

CONFERENCES AND POSTER PRESENTATIONS

ISAS 2023 Annual Meeting, Bradley University.

Podium Presentation:

Finding the Optimal Spectral Resolution for Analysis of Molecular Line Observations of a Sample of High-Mass Star Forming Regions

April, 2023
Peoria, Illinois.

Natural Science Research Day 2023, Western Illinois University

Poster Presentation:

Molecular Line Observations of Ammonia and Methanol towards Ionized-Jet Candidates.

April, 2023
Macomb, Illinois.

Spring 2023 Meeting of ISAAPT, Knox College

Poster Presentation:

Molecular Line Observations of Ammonia and Methanol towards Ionized-Jet Candidates.

March, 2023
Galesburg, Illinois.

Graduate Research Conference, Western Illinois University

Podium Presentation:

Finding the Optimal Spectral Resolution for Analysis of Molecular Line Observations of a Sample of High-Mass Star Forming Regions

March, 2023
Macomb, Illinois.

American Physical Meeting Prairie section (PSAPS)

Poster Presentation:

Molecular Line Observations of Ammonia and Methanol towards Ionized-Jet Candidates.

November 30th, 2023
Columbia, Missouri

243rd American Astronomical Society Meeting (AAS)

Poster Presentation:

Nature of Methanol and Ammonia Lines Detected in VLA Broad-Band Continuum Observations towards Ionized-Jet Candidates

January 12th, 2024
New Orleans, Louisiana

244th American Astronomical Society Meeting (AAS)

Poster Presentation (Co-author):

Testing Non-LTE Codes to Model Methanol Observations of Ionized Jets in High-Mass Star Forming Regions

June 12th, 2024
Madison, Wisconsin

TECHNICAL SKILLS

Operating Systems: Mac OS/X, Windows and Linux.
Software Experience: Python, C++, Mathematica, Java, Advanced Excel, SQL.
Scientific Packages: Common Astronomy Software Applications(CASA), Jetstream, Radex (For calculating the strengths of atomic and molecular lines from interstellar clouds).

AWARDS AND HONORS

“Chairman’s Award for Comprehensive Accomplishments”

Department of Physics, Western Illinois University

May 2024
Macomb, Illinois

“Chairman’s Award for Excellence in Service” <i>Department of Physics, Western Illinois University</i>	May 2024 Macomb, Illinois
“Outstanding Second Year Graduate Student Award” <i>Department of Physics, Western Illinois University</i>	May 2024 Macomb, Illinois
“Outstanding First Year Graduate Student Award” <i>Department of Physics, Western Illinois University</i>	May 2023 Macomb, Illinois
“Chairman’s Award for Excellence in Research” <i>Department of Physics, Western Illinois University</i>	May 2023 & May 2024 Macomb, Illinois
“Women in Science” <i>Department of Physics, Western Illinois University</i>	May 2023 Macomb, Illinois
“Third Place Graduate Poster” <i>National Research Science Day, Western Illinois University,</i>	April, 2023 Macomb, Illinois
“Second Place Graduate Oral Presentation” <i>Physics, Astronomy and Maths Division, Bradley University</i>	March, 2023 Peoria, Illinois

GRANTS AND FELLOWSHIP

“2023-2024 Gladwyn Barrett Scholarship” <i>Department of Physics, Western Illinois University</i>	Dec 2023 Macomb, Illinois
“ 2022-2023 Donald R. Bride Scholarship” <i>Department of Physics, Western Illinois University</i>	Nov 2022 Macomb, Illinois
“Introductory Summer School for Astronomy and Astrophysics” IUCAA	May 2021 Pune, India

OUTREACH ACTIVITIES

- ‘AstroNight’ events, Assistant Organizer**
Tasks: Setting up the manual and technologically advanced telescopes and managing the crowd attending the event.
- ‘Exploring Upcoming Eclipses’**
Guided High-School Students on Computer-based activity exploring upcoming eclipses at Western Illinois University.
- ‘Lewistown Middle-School Visit’**
Guided High-School Students on the use of Solar telescopes at Western Illinois University.
- ‘Science Olympiad’**
Created tests for two sections ‘Solar System’ and ‘Astronomy’ for Junior and High school student teams.