# Punya Paudel

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## Academic Background

**Ph.D. in Astrophysics** 2025 – Present
*University of Oklahoma, Norman, Oklahoma.* *Concentrations: White Dwarf*
Research Supervisor: Mukremin Kilic

**Master of Science in Physics** 2022 – 2024
*Western Illinois University, Macomb, Illinois.* *Concentrations: Radio Astronomy*
Research Supervisor: Esteban D. Araya

**Bachelor of Science in Physics** 2011 – 2014
*Prithvi Narayan Campus, Pokhara, Tribhuvan University, Nepal.*

## Teaching Experience

**Graduate Teaching Assistant, Department of Physics and Astronomy, University of Oklahoma, Norman, OKlahoma.** 2025 – Present

Courses: Electricity and Magnetism I, General Physics for Engineering and Science Majors

**Instructor, Department of Physics, Western Illinois University, Macomb, Illinois.** 2024 – 2025

Courses: University Physics I (Mechanics), Physics Lab I (Mechanics), University Physics III (Electromagnetism), Physics Lab III (Electromagnetism)

**Teaching Support Assistant, Department of Physics, Western Illinois University, Macomb, Illinois.** 2022 – 2024

Courses: University Physics I (Mechanics), University Physics II (Waves, Thermodynamics, and Optics), University Physics III (Electromagnetism), Physics Lab III (Electromagnetism), University Physics IV (Modern Physics), Physics Lab IV (Modern Physics).

## Research Experience

**Graduate Teaching Assistant, Department of Physics and Astronomy, University of Oklahoma, Norman, Oklahoma** 2025 – Present

* Main Project: Light curve modeling of AM CVn stars.
  Supervisors: Matthew Green, Ph.D. and Mukremin Kilic, Ph.D.

**Teaching Support Assistant, Department of Physics, Western Illinois University, Macomb, Illinois** 2022 – 2024

- Main Projects: Continuum Imaging of High-Mass Star-forming regions, Modeling of molecular lines in High-Mass Star-forming regions.
  Supervisor: Esteban D. Araya, Ph.D.

**Master's Thesis**

- Thesis Title: Calibration and Modeling of Methanol Lines towards Ionized Jet Candidates
- Thesis advisor: Esteban D. Araya, Ph.D.

**Continuum Imaging of High-Mass Star-forming regions**

High spectral and angular resolution Very Large Array observations at 1.3 cm of three radio continuum sources with methanol and ammonia lines were made by our group to investigate the kinematics of molecular gas associated with the jets and determine the nature of the emission. We imaged the continuum of the three sources using one of the narrow spectral windows (SPWs) and compared it to the continuum from three broadband SPWs as well as with previous continuum measurements reported by Rosero et al. (2016) to check for consistency in the flux density calibration. The radio continuum from the narrow SPWs was in agreement with the continuum measurements from Rosero et al. (2016) for all three sources.

**Modeling of molecular lines in High-Mass Star-forming regions**

To characterize the molecular environment associated with ionized jets in regions of high-mass star formation, we conducted VLA A-configuration observations of three ionized jets in multiple molecular species and transitions. We modeled our observations using non-LTE radiative transfer codes, specifically MolPop (Asensio Ramos and Elitzur, 2018) and RADEX (Van der Tak et al. 2007). Both codes produced similar results at low kinetic temperatures ($< 20$ K) and molecular column densities ($< 10^{15}$ cm$^{-2}$), but significant discrepancies were observed at higher temperatures and column densities, where MolPop generated models that were more consistent with the maser line ratios.

## Conferences And Poster Presentations

**244th American Astronomical Society Meeting (AAS)** June 12, 2024
*Poster Presentation:* *Madison, Wisconsin*
*Testing Non-LTE Codes to Model Methanol Observations*
*of Ionized Jets in High-Mass Star Forming Regions*
***Webpage:*** *https://ui.adsabs.harvard.edu/abs/2024AAS...24430209P/abstract*

**243rd American Astronomical Society Meeting (AAS)** January 12, 2024
*Poster Presentation:* *New Orleans, Louisiana*
*Nature of Methanol and Ammonia Lines Detected in*
*VLA Broad-Band Continuum Observations towards Ionized-Jet Candidates*
***Webpage:*** *https://ui.adsabs.harvard.edu/abs/2024AAS...24340216R/abstract*

**APS-PS Fall 2023 Meeting, University of Missouri** December 1, 2023
*Poster Presentation:* *Columbia, Missouri*
*Continuum Imaging of Three High-Mass Star Forming Regions.*

**APS-PS Fall 2023 Meeting, University of Missouri** December 1, 2023
*Poster Presentation:* *Columbia, Missouri*
*The Nature of Methanol and Ammonia Lines Detected in VLA Broadband Continuum*
*Observations towards Ionized-Jet Candidates.*

**ISAS 2023 Annual Meeting, Bradley University** April 15, 2023
*Podium Presentation:* *Peoria, Illinois*
*Continuum Imaging of Three High-Mass Star Forming Regions.*

**Spring 2023 Meeting of the ISAAPT, Knox College** March 17, 2023
*Podium Presentation:* *Galesburg, Illinois*
*Imaging the Continuum Emission of Three High-Mass Star-Forming Regions*

## Awards And Honors

**"Chairman's Award for Comprehensive Accomplishments"** 2024
*Department of Physics, Western Illinois University* *Macomb, Illinois*

**"Outstanding Second Year TSA"** 2024
*Department of Physics, Western Illinois University* *Macomb, Illinois*

**"Chairman's Award for Excellence in Service"** 2024
*Department of Physics, Western Illinois University* *Macomb, Illinois*

**"Third Place Graduate Poster, WIU 2024 Natural Science Research Symposium"** 2024
*Department of Physics, Western Illinois University* *Macomb, Illinois*

**"Outstanding First Year Graduate Student Award"** 2023
*Department of Physics, Western Illinois University* *Macomb, Illinois*

**"Chairman's Award for Excellence in Research"** 2023
*Department of Physics, Western Illinois University* *Macomb, Illinois*

## Grants and Fellowship

**"Dodge Family College of Arts and Sciences Harwell Scholarship"** 2026-2027
*University of Oklahoma* *Norman, Oklahoma*

**“Donald E. Hall Scholarship”** 2026-2027
*University of Oklahoma* *Norman, Oklahoma*

**“Gladwyn Barrett Fund Scholarship in Physics”** 2023-2024
*Department of Physics, Western Illinois University* *Macomb, Illinois*

**“Gladwyn Barrett Scholarship in Physics”** 2022-2023
*Department of Physics, Western Illinois University* *Macomb, Illinois*

## Technical Skills

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| **Operating Systems:** | Mac OS, Windows and Linux. |
| **Programming Languages:** | Python, C++, Fortran. |
| **Publishing and other Software:** | Microsoft Office, Overleaf, Mathematica |
| **Scientific Packages:** | Common Astronomy Software Applications (CASA),<br>MolPop and RADEX (non-LTE radiative transfer codes),<br>MESA (Modules for Experiments in Stellar Astrophysics).<br>IRAF (Image Reduction and Analysis Facility) |