

Spring 2024 Colloquium

Physics and Astronomy, Texas A&M University – Commerce

Monday, May 20, 2024

4:00 pm to 5:00 pm, McFarland Science Building 127

(coffee and cookies will be served at 3:50 pm)

Astrophysics

Unveiling the Mysteries of Pulsars, Neutron Stars, and their Interaction with the Interstellar Medium

Dr. Jun Yang, Harvard & Smithsonian Center for Astrophysics

Abstract

The formation and evolution of compact objects such as neutron stars and black holes within stellar systems offer a unique window into the cosmos, allowing us to explore their emissions and interactions with the interstellar medium (ISM), planetary ionospheres, and magnetospheres, including Earth. My journey in unraveling these cosmic phenomena began with a focus on Earth's atmosphere, drawing inspiration from its magnetosphere to delve into more extreme magnetic environments, particularly the magnetospheres of pulsars. Currently, my research also centers on the metal composition of the ISM, serving as a crucial link between ionospheric studies and pulsar sciences. In this colloquium talk, I aim to present a comprehensive overview of my work, with a focus on three key areas:

- **Mining Insights from the Pulsar Library:** Building a comprehensive library of Magellanic Cloud pulsars, I extract valuable scientific insights.
- **Classifying Neutron Stars and Black Holes in Nearby Galaxies:** By studying neutron stars and black holes in galaxies such as M33 and IC10, I contribute to our understanding of their diverse populations.
- **Probing the ISM with Si Gas and Dust Absorption:** I explore the metal composition of the ISM through observations of Si gas and dust absorption columns along different lines of sight in the Galactic Bulge, paving the way for future investigations with multi-wavelength telescopes in galaxies within the Local Group.

Furthermore, I will discuss the implications of my research for Texas A&M University-Commerce, particularly in the context of searching for pulsars near the Galactic Center (GC). Such endeavors hold promise for unlocking insights into gravitational potentials, axions, and magnetoionic environments in this dynamic region of the GC.



Jun Yang conducted her Ph.D. research in astrophysics and physics at the Harvard-Smithsonian Center for Astrophysics as a pre-doctoral fellow and at the University of Massachusetts in Lowell, following her master's degree in Space Physics from the Chinese Academy of Sciences. She continued her academic journey at the University of Utah and Massachusetts Institute of Technology (MIT), focusing on pulsars, neutron stars, and the interstellar medium.

Throughout her career, Jun has been recognized with several awards for her outstanding contributions to the community. For example, she was honored with the 'Infinite Expansion Award' from MIT, a prestigious accolade nominated by the dean of the physics department, a distinguished physics professor, and a respected research scientist at the Kavli Institute.