

Expanding Space Research Through Collaboration

Using Cyclic Spectroscopy to Study the Interstellar Medium with Pulsar Timing Arrays

Jacob E. Turner

Green Bank Observatory

Rapidly rotating neutron stars, known as pulsars, are valuable tools for studying the time-evolving structure and behavior of the interstellar medium. By utilizing the many lines of sight through this medium afforded by the decades-long timing of many pulsars via pulsar timing arrays, we can begin to construct a comprehensive image of our galaxy's dynamics on astronomical unit-to-parsec scales. Unfortunately, the prioritization of timing resolution by pulsar timing arrays often results in insufficient frequency resolution to study the most scientifically interesting of these lines of sight. However, by processing pulsar data while taking advantage of the cyclostationary nature of their emission as viewed from Earth, we can achieve simultaneous high time and frequency resolution in these data while also improving the sensitivity of pulsar timing arrays to gravitational waves.

About the Presenter

Jacob Turner is a postdoctoral fellow at the Green Bank Observatory. He holds a B.A. in physics from Oberlin College and a PhD in physics from West Virginia University. His research interests include using pulsars to study the interstellar medium and using pulsar timing arrays to detect nanohertz-frequency gravitational waves. He is actively involved in the development and implementation of the real-time cyclic spectroscopy backend at the Green Bank Observatory, which will allow for pulsar data with simultaneous high time and frequency resolution, and accurate corrections to pulse arrival time delays due to interstellar scattering.



Wednesday, September 11, at 03:30 p.m.



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Upcoming Talks/Dates

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09/25/2024

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About the Series

Inspired by UCF's latest Strategic Plan, the Florida Space Institute (FSI) is undertaking new efforts to promote space research at UCF. We are thrilled to continue this Seminar Series this spring focusing collaboration, which highlights the diversity of space-related topics investigated by UCF faculty. From growing plants on the Moon to fighting astronaut osteoporosis to planetary defense nothing is off-limits in these seminars! We cordially invite you to join us to foster new collaboration opportunities and help grow space research at UCF!

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