Contribution ID: **34** Contribution code: **CC05** Type: **Talk**

Searching for Spider-Like Pulsars from TESS Ellipsoidal Lightcurves with X-ray counterparts

Tuesday, January 6, 2026 4:25 PM (15 minutes)

We present a search for new spider pulsar candidates through multi-wavelength cross-matching, including γ-ray, X-ray, and optical data. A search for sinusoidal-like optical modulations in TESS data of 183 eROSITA X-ray sources coincident with unassociated \textit{Fermi}-LAT γ-ray sources led to the identification of four promising spider pulsar candidates. We found optical variability periods ranging from 5 to 13 hours. All candidates display smooth sinusoidal-like phase light curves, similar to what can be expected from ellipsoidal variation; one show double-peaked profiles indicative of harmonics. The absence of sharp minima, which are often found in black widow systems due to irradiation, suggests these sources are more likely redback-type binaries. One source is included in a machine-learning catalog of unassociated γ-ray sources, with relatively high pulsar probabilities. We also identify potential Gaia counterparts for several sources and estimate their distances and luminosities where parallax measurements are available. Future observations, including further spectroscopic and multi-wavelength studies, are needed to fully characterize these systems.

Author: Dr PAL, Partha Sarathi (Laboratory for Space Research, HKU)

Co-authors: Prof. TAM, P. H. Thomas (Sun Yat-sen University); Mr DIWAN, Rishank (The University of Hong Kong); Mr HUANG, Wen-Jun (Sun Yat-sen University); Ms LIANG, Xiaoqing (Sun Yat-sen University)

Presenter: Dr PAL, Partha Sarathi (Laboratory for Space Research, HKU)

Session Classification: Contributed talks

Track Classification: CC05: Galaxies, AGNs, Black Holes and Cosmology