

# Discovery of Bow-Shock Pulsar Wind Nebulae in the EMU Surveys

Thursday, 9 May 2024 09:25 (15 minutes)

Pulsars and their Wind Nebulae exhibit intriguing features when moving at supersonic speeds through ambient medium, such as bow-shaped shocks and cometary tails. Studying the PWNe provides valuable insights into pulsars, radiative efficiency, properties of the surrounding medium, and the physics of the wind-medium interaction. Additionally, it contributes to our understanding of the distribution of the natal kick velocities that neutron stars acquire during supernova implosions.

The first report of this phenomenon dates back to 1987, and prior to the Chandra X-ray Observatory's launch in 1999, only a handful of PWNe had been identified. Chandra's enhanced capabilities have led to the identification of approximately 30 pulsars displaying signs of supersonic motion. However, recent advancements in radio-continuum surveys obtained with ASKAP and MeerKAT have transformed the rarity of these objects. In this presentation, I will summarize the discovery and analysis of Potoroo, a remarkable bow-shock PWN with one of the longest radio tails, detected in the EMU pilot survey. The latter part of the talk will highlight the six best new examples of the class, showcasing a diverse range of morphologies. All discoveries have been made in the Galactic Plane fields of the EMU main survey, with promising prospects for more to come.

## keywords

pulsar wind nebulae, SNRs, galactic astronomy

## In-person or online?

online

## Career level

Student

**Primary authors:** LAZAREVIC, Sanja (Western Sydney University); FILIPOVIĆ, Miroslav (western Sydney University); DAI, Shi (CSIRO Astronomy and Space Science); MAITRA, Chandreyee; EDWARDS, Philip (CSIRO Astronomy & Space Science); AHMAD, Adeel (Western Sydney University); ALSABERI, Rami (Western Sydney university)

**Presenter:** LAZAREVIC, Sanja (Western Sydney University)

**Session Classification:** Galactic