

The TRAPUM Survey for New Gamma-ray Pulsars

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TRANSients and PULsars with MeerKAT (TRAPUM) is a large survey project using the new MeerKAT radio interferometer to search for new pulsars in the Southern sky. TRAPUM performs targeted searches of parts of the sky that are most likely to host previously unknown pulsars: globular clusters; nearby galaxies; supernova remnants, pulsar wind nebulae and other TeV sources; and unidentified gamma-ray sources detected by the *Fermi* Large Area Telescope (LAT). In this talk, I will present TRAPUM's survey of *Fermi*-LAT gamma-ray sources, and the 21 new millisecond pulsars (MSPs) that we have discovered, nearly half of which are in exotic "spider" binary systems with low-mass, irradiated companion stars. I will describe how detection and timing of gamma-ray pulsations in the *Fermi*-LAT data immediately provides us with 14-year ephemerides for these new MSPs, enabling follow-up searches for continuous gravitational waves in public LIGO data, and often revealing complex long-term orbital period variations due to activity in companion stars. I will also describe how we are obtaining pulsar mass measurements from our new spider binaries via optical modelling to constrain the maximum neutron star mass and equation of state.

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