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# The origins of radio pulsar polarization: a broad-band view

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For the past half-century, pulsars have been used to push the boundaries of our understanding of the Universe, yet our understanding of pulsar radio emission is still limited by many unanswered questions. Polarimetry provides important information about pulsar emission geometry and magnetic field processes, but the pulsar population exhibits considerable variety in its polarimetric behaviour that is not well captured by the canonical descriptions of pulsar emission. In recent years however, new and upgraded telescopes have given us a broad-band time- and frequency-resolved perspective of pulsar radio polarization, enabling us to study the origins of radio pulsar polarization in detail.

In this talk I will present results from a broad-band survey of radio pulsars made with the Parkes Ultra-Wideband receiver and describe how these new observations update the picture of radio polarization in the pulsar population. I will discuss the magnetospheric origins of the polarization features observed, particularly the origins of circular polarization, and explain how they can be captured in a simple three-parameter model. By modelling broad-band time-resolved pulsar observations in this way, we will be able to improve our understanding of pulsar geometry by properly accounting for the impact of the magnetosphere. This work demonstrates the importance of modern time-resolved and frequency-resolved polarimetry for understanding transient radio emission.

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