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Properties of the low emission population in PSR B0329+54 and its implications to pulsar emission regions

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We present the results from our recent investigation of PSR B0329+54 for the properties of an emission mode in which the single pulses emit low intensity. The pulsar has long been known to demonstrate profile mode-changing between two profile shapes originating from the abnormal and normal modes, respectively. We find that the emission properties of the single pulses around the low emission mode is dependent on the two profile modes. This suggests that emission from the low emission mode varies with time. In addition, study of the emission changes during the low emission mode reveals that the single pulse emission is also space (phase) dependent. This leads us to the assumption that the emission region of some radio pulsars may be divided into segments, with each segment possessing unique emission properties which may change with time. This is consistent with observations that single pulse emission from more and more radio pulsars displays different emission features across different parts of the same integrated pulse profile. Specific example includes the detection of drifting subpulses of different drift patterns at different components of the same integrated profile in some pulsars. Since subpulse drifting is closely related to the emission properties, the coexisting of different drift patterns in a pulsar suggests that the radio emission region is composed of different emission properties at different locations. Our assumption may have applications to other pulsar phenomena.

Biography

My research focus on radio observation and theoretical (analytical and numerical) studies in pulsar astrophysics. I am interested in time-dependent single pulse emission events both observationally and theoretically. Another stream of my research involves exploring pulsars with abrupt changes in the observed emission properties, such as that observed in intermittent pulsars.

I am currently holding a position of a full researcher at the Xinjiang Astronomical Observatory in Urumqi, China. The observatory is also the home for the 110-metre QiTai radio Telescope (QTT) project.

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