

Interstellar scintillation observations for PSR B0355+54

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In this paper, we report our investigation of pulsar scintillation phenomena by monitoring PSR B0355+54 at 2.25GHz for three successive months using the Kunming 40-m radio telescope. We measured the dynamic spectrum, the two-dimensional correlation function and the secondary spectrum. These observations have a high signal-to-noise ratio ($S/N \geq 100$). We detected scintillation arcs, which are rarely observable using such a small telescope. The submicrosecond scale width of the scintillation arc indicates that the transverse scale of the structures on the scattering screen is as compact as astronomical unit size. Our monitoring shows that the scintillation bandwidth, the time-scale and the arc curvature of PSR B0355+54 were varying temporally. A plausible explanation would need to invoke a multiple-scattering-screen or multiple-scattering-structure scenario, in which different screens or ray paths dominate the scintillation process at different epochs.