

Imaging pulsar echoes at low frequencies

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Interstellar scattering is known to broaden distant objects spatially and temporally. The latter aspect is difficult to analyse, unless the signals carry their own time stamps. Pulsars are so kind to do us this favour. Typically the signature is a broadened image with little or no substructure and a similarly smooth exponential scattering tail in the profile. The case of B1508+55 is special: The profile shows additional components that are moving relative to the main pulse with time. We use low-frequency VLBI to test the hypothesis that these components are actually such scattering-induced echoes, by trying to detect the expected angular offset.

Using international stations and the phased-up core of the LOFAR array, we can do interferometry with high resolution in time and space. This talk presents a selection of results from an ongoing large-scale monitoring campaign. We can not only detect the offset, but even image a full string of echoes, and relate the positions with delays. What we find is apparently consistent with scattering by highly aligned components in a single screen. Further investigations will help us to understand more details of the scattering process.