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NEW DEVELOPMENTS IN SETI LONG-BASELINE INTERFEROMETRY

Abstract

Interferometry offers some significant advantages for SETI research that single dishes and beam-formed arrays do not. We have been developing a SETI capability using the European VLBI Network (EVN) and e-MERLIN, building on short observations of radio sources in the Kepler field made at 21cm. Several scans were correlated at JIVE (EVN expt RSG12) with very high spectral resolution (16k channels over a 8 MHz band). One of these scans includes J1926+4441 - this VLBA calibrator is located close to the exoplanet Kepler-111b. We detected a highly unusual feature in the data that is observed in both the autocorrelation and (very surprisingly) also the cross-correlation data. The feature is also seen in low spectral resolution data but is much less obvious and would probably go unnoticed in a conventional data analysis/inspection. We believe this feature is not real but is an artifact in the data that is associated with HI filling the beam of the EVN antennas and raising their system temperatures. We have confirmed this by observing sources within and outwith the galactic plane (EVN expt RSW02). At the time of our observations, we detect no transmitters associated with Kepler 111b with an Equivalent Isotropically Radiated Power (EIRP) ¿ 3.75E15 Watt. This work (Wandia et al. 2023) represents an important step forward in using the EVN/e-MERLIN (and VLBI in general) for SETI follow-up observations.