EUROPEAN VLBI NETWORK
14th EVN Symposium & Users Meeting
Granada, October 8-11 2018

Pulsar scintillometry on the Vela pulsar with the LBA

Franz Kirsten

The ionized interstellar medium scatters the spatially coherent signal of pulsars, leading to multi-path propagation evident as scintillation in the observer's plane. In a dynamic spectrum, i.e. the flux density distribution as a function of frequency and time, scintillation becomes apparent as a criss-cross pattern of intensity variations. In the 2D power spectrum of the dynamic spectrum -- the so-called secondary spectrum -- the power is distributed along a parabola through the origin. The curvature and shape of this parabola give us insights about the distance of the scatterer and the level of anisotropy in the scattering medium. If observed with VLBI, one can use the phase information in the secondary spectrum to map out the scattering screen. Combined with the distance to the scattering screen, this map can be used to perform high precision astrometry of the pulsar itself.
In a recent campaign we observed the bright, strongly scattered Vela pulsar at 1.6 GHz with the Long Baseline Array. We clearly detect the parabolic structures in the secondary spectra of both visibility amplitudes and phases. In this talk I will present the results from this campaign and discuss the conclusions we draw given the distance and screen orientation that we find.