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All-sky high-time resolution monitoring of transient sky with SKA-Low stations

The low-frequency Square Kilometre Array (SKA-Low) is currently under construction in Western Australia. Since 2019, two SKA-Low prototype stations AAVS2 and EDA2 have been used for testing and verification of technology, stability of the signal chain, calibration procedures etc. I will briefly summarise outcomes of this work and how they inform SKA-Low design and construction. In the main part of my talk I will present software and hardware efforts to use individual SKA-Low stations for high-time resolution all-sky monitoring of radio transients.

In particular, there are indications that at least some Fast Radio Bursts (FRBs) can be detected at frequencies below 350 MHz. This is supported by hundreds of CHIME detections down to 400 MHz, and several FRBs detected by LOFAR and other instruments in the northern hemisphere. Given the expected FRB rates at these frequencies, a single SKA-Low station is sufficiently sensitive to detect even hundreds of FRBs per year in images of the entire visible hemisphere (all-sky images). Hence, an all-sky monitoring system implemented on SKA-Low stations can open a new parameter space for FRBs and other astrophysical transients searches in terms of frequency, southern sky coverage and enormous instantaneous field of view.

Serdecznie zapraszam,
Agnieszka Majczyna