



Signal Processing Chain in SKA LOW

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The Square Kilometer Array-LOW (SKA LOW) is a highly sensitive next generation radio telescope currently under construction in Australia. SKA LOW will consist of 131072 cross-polarized log-periodic dipole antennas distributed across 512 low-frequency aperture array (LFAA) stations operating over the frequency range of 50 – 350 MHz with baselines from 50 m to 65 Km. Each LFAA station consists of 256 antennas that are grouped into 16 tiles of 16 antennas in a Tile Processing Module (TPM). Electromagnetic signal from orthogonal polarizations of individual antennas are amplified at the station in a Front-End Module (FEM) and converted to optical analog signals that are then transferred to the TPMs. The TPMs are placed in a controlled environment called the Central Processing Facility (CPF) and Remote Processing Facility (RPF) via Radio Frequency over Fibre (RFoF) link. The first stage of digitization and processing in SKA LOW happens at the TPMs and the digitized signals are again sent over RFoF links to the Pawsey Science Processing Centre (SPC) in Perth. The SPC hosts the Correlator and Beamformer (CBF) that receives the digital filter bank signals from individual stations that are further processed to produce full polarization cross-products that will be used for imaging observations and the beamformed voltage streams for pulsar and VLBI observations. In this talk, I will discuss in detail the full digital signal chain for the LOW telescope from antennas unto to the Central Signal Processor (CSP) that consists of the CBF and Pulsar processing modules. I will also discuss the various signal processing modes at each level and touch upon the science capabilities that is expected to be supported by them.