EGU22-10960
https://doi.org/10.5194/egusphere-egu22-10960
EGU General Assembly 2022

First detailed polarimetric study of type III solar radio bursts with the Murchison Widefield Array

Soham Dey, Devojyoti Kansabanik, and Divya Oberoi
National Centre for Radio Astrophysics, Tata Institute of Fundamental Research, Pune, India, Pune, India
(sdey@ncra.tifr.res.in)

Type III solar radio bursts form a well known class of active solar emissions and are associated with energetic electron beams propagation outwards through the coronal plasma, and in the process giving rise to their characteristic rapid spectral drifts. Though they have been the subject of a large number of studies since their discovery in the 1950s, the high fidelity and dynamic range spectroscopic snapshot images from the new technology instruments, like the Murchison Widefield Array (MWA) are enabling the exploration of a previously inaccessible part of phase space and leading to the discovery of previously unknown aspects of these well known bursts even in recent times (e.g. Mohan et al., 2019, ApJ, 875). We have now developed a robust and general full Stokes polarization calibration and imaging algorithm optimized for MWA solar observations.. Referred to as “Polarimetry using Automated Imaging Routine for Compact Arrays for the Radio Sun'' (P-AIRCARS; Kansabanik et al., 2022, in prep.), it can deliver full Stokes solar images with leakages on par with usual astronomical radio maps. Here we use this novel capability to carry out a detailed polarimetric study of a type III solar radio burst observed with the MWA. This is, once again, enabling an exploration of new phase space with an exciting discovery potential. Preliminary results show that these type III bursts show presence of linearly polarized emission. While conventional wisdom says that all traces of linear polarization should get washed out due to differential Faraday rotation in the corona, we have convincing reasons to believe that this emission is solar in origin. Here we present the current status of our first detailed polarimetric imaging study oa this type III radio source.