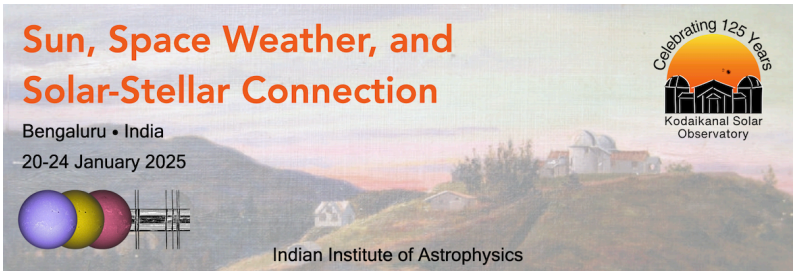

Contribution ID: **182** Type: **Poster**

An Automated Real-time Trigger for Solar Radio Burst detection for the Murchison Widefield Array using Yamagawa spectrograph

Solar radio bursts are often byproducts of phenomena like coronal mass ejections (CMEs) and/or solar flares. They are capable of producing very high brightness temperatures and hence lead to a large increase in the observed intensity. Depending upon the details of the physical processes and emission mechanisms involved, their dynamic spectra can show markedly different spectro-temporal structures, based on which they are classified into several types. Detecting and studying solar bursts is extremely important for understanding coronal emission mechanisms as well as for improving space-weather predictions. However, most studies of solar radio bursts have been performed using dynamic spectra which do not provide any spatial or morphological information. In recent times, the capabilities of the cutting edge radio interferometers, like the Murchison Widefield Array (MWA), a precursor for the Square Kilometre Array Observatory (SKAO), accompanied by the developments in interferometric calibration and imaging, provide a good match to the needs of solar radio observations. However the observing time of these versatile instruments is rather oversubscribed and only a limited amount is available for solar observations. In addition, the infrequent and unpredictable nature of radio bursts makes it very inefficient to observe them using observations based on an observing schedule decided well ahead of time. These 'blind'observations tend to be a bit like fishing expeditions – one never knows what one will come back with. A robust and reliable automated near-real-time observing trigger can improve this situation dramatically. By enabling one to use precious observing time only when some solar activity is known to have just taken place, such a system can vastly increase the efficiency of limited available observing time to capture instances of solar activity. With observatories like the SKAO on the horizon, the need for such a system is even more imperative. We demonstrate a solar burst triggering pipeline which takes near-real time data from the Yamagawa spectrograph, analyzes it to detect presence of solar activity and generates a trigger, when required, to schedule solar observations at the MWA. These triggers have been tested and tuned using the archival Yamagawa data and end-to-end tests of triggered observations have successfully been carried out at the MWA. Recently this real-time triggering has been operationalized at the MWA, a very timely development in view of the approaching solar maxima.

Contribution Type

Theme

Connecting Solar Corona to Heliosphere

Primary author: PATRA, Deepan (National Centre for Radio Astrophysics)

Co-authors: KANSABANIK, Devojyoti (University Corporation for Atmospheric Research); Dr KUBO, Yuki (National Institute of Information and Communications Technology, Japan); OBEROI, Divya (National Centre for

Radio Astrophysics, Tata Institute of Fundamental Research); Dr WILLIAMS, Andrew (International Centre for Radio Astronomy Research, Curtin University, Bentley, WA, Australia); Dr NISHIZUKA, Naoto (National Institute of Information and Communications Technology, Japan)

Presenter: PATRA, Deepan (National Centre for Radio Astrophysics)