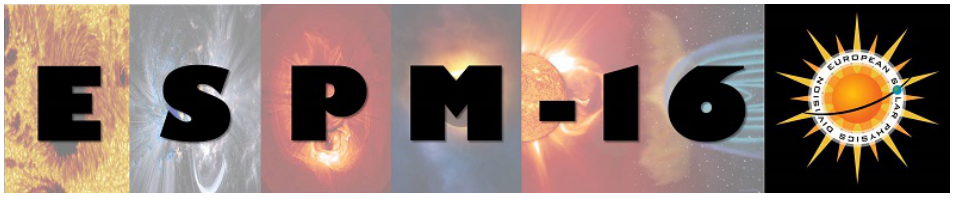

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Understanding the characteristics of solar WINQSEs

Monday, 6 September 2021 15:56 (13 minutes)

The confluence of the data from the Murchison Widefield Array and an imaging pipeline tailored for spectroscopic snapshot images of the Sun at low radio frequencies have led to enormous improvements in the imaging quality of the Sun. These developments have lowered the detection threshold for nonthermal emissions by up to two orders of magnitude as compared to earlier studies, and enabled our discovery of Weak Impulsive Narrowband Quiet Sun Emissions (WINQSEs). In our studies we find WINQSEs to be consistent with the radio signatures of coronal nanoflares, hypothesized by Parker (1988) to explain coronal heating in the quiet Sun emissions. As a first step towards exploring this tantalising possibility of making progress on the coronal heating problem, we have been pursuing multiple projects to better understand the observational characteristics of WINQSEs. These include attempts to look for WINQSEs in multiple independent datasets; attempting to characterise their morphologies in radio maps using Artificial Intelligence/Machine Learning based approaches; understanding their spectro-temporal structure by making solar images with a time resolution of a few milliseconds and frequency resolution of ~100 kHz. Here we present the current status of these projects.

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