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NenuFAR performances for solar radio observations at high spectral and temporal resolutions

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NenuFAR is the tied-array radio instrument recently deployed in France. It is the low-frequency extension of LOFAR. It covers frequencies between 10 and 85 MHz. Its large collecting surface (53000m² at 25MHz) makes it very sensitive. Spectral and temporal resolution can be very high, respectively, at <5kHz and < 3ms. Such resolution, associated with high sensitivity, is unique at low frequency. Each antenna is composed of two perpendicularly orientated antennas allowing polarization measurements in the four Stokes parameters. Observations were performed between December 16 and 25, 2021, for two hours around the maximum of Sun elevation. Several sunspot groups were present on the solar surface. In terms of flares, the activity was low during the observing time. Still, many Type III bursts were recorded, some with exceptional fine structures as stria or slowly drifting emission, others with a very weak signal. The capabilities of NenuFAR observations with such high resolution and polarimetric modes are presented. At the beginning of the solar cycle 25, the instrument provides unprecedented possibilities to study the solar corona.