



NOEMA – The Northern Extended Millimeter Array

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The NOEMA observatory (Northern Extended Millimeter Array) is the successor of the Plateau de Bure Interferometer (PdBi), which consisted of 6x15m antennas located at the Plateau de Bure, in the French Alps, located at an altitude of ~2500 m. The interferometer had two tracks: a North-South of ~370 m length and an East-West track of about 760 m. The NOEMA project goals are to improve the sky coverage on the northern hemisphere with orders of magnitude higher sensitivities and higher spatial resolution.

To achieve this, 6 additional 15 m antennas were constructed and commissioned between 2015 and 2021 and the East-West track was extended in 2020-2022 from 760 m to 1700 m, thereby improving sensitivities and the angular resolution by a factor of 2. At the same time, the instrumentation was upgraded with state-of-the-art heterodyne receivers, allowing observations in 4 bands (3 mm, 2 mm, 1.3 mm or 0.85 mm – note that only one band can be observed at a given time). The technology uses sideband separation SIS-based receivers, in a dual polarization mode, with 4-12 GHz IF bandwidth, thereby increasing the instantaneous receiver bandwidth by a factor of 4.

The observatory has recently completed all these major elements in 2022. We will present the global instrument, its key subsystems, their main characteristics, and performances. Several science examples will illustrate the potential of this new facility and we will also present some of the next coming upgrades, such as the implementation of a dual band observing mode capability (observing the 3 mm and 1.3 mm in parallel).



Figure 1. NOEMA with 12 antennas in D-configuration during January 2022