



## Status report on the NIKA2 instrument, a dual-band kilopixel KID array for millimetric astronomy

**Main author:**

CALVO Martino

**Co-authors:**

Calvo Martino, Institut Néel, CNRS Grenoble  
NIKA core team X, Various

The NIKA (New IRAM KID Array) camera has been a pathfinder instrument for the Kinetic Inductance Detectors community, being the first camera to perform on-sky observation using a multiplexed readout of KID arrays. Building on this experience, we are now developing the next-generation camera, NIKA2, that will be installed at the IRAM 30m telescope in Sierra Nevada (Spain).

NIKA2 will be equipped with a total of 3 arrays: one for the 2mm band, and 2 for the 1.25mm band, one for each polarization, in order to provide polarization-sensitive observations at this wavelength. The large available correct Field of View (6.5arcmin) will be fully sampled using LEKID based on the Hilbert geometry. Each array will therefore have more than 1000 pixels. The Hilbert LEKID have already been tested for astronomical observation in NIKA, and have shown state-of-the-art performances approaching the photon-noise limit.

The cryostat used to cool down the arrays is based on a dilution refrigerator coupled to two Pulse Tube coolers. The system can thus work continuously, without the need for recycling, and can be fully operated remotely. The readout of the pixels signal will be done using the Frequency Domain Multiplexed strategy typical of KID detectors. A dedicated board called NIKEL has been developed to this scope, which allows us to reach a multiplexing factor of roughly 250 over a 500MHz bandwidth.

When fully operational, this ground-breaking instrument will represent a unique tool for the astronomers, with many potential fields of applications. These include for example the detailed mapping of the SZ effect in cluster of galaxies or the study of star-forming regions.

We report the current status of the NIKA2 development, and outline the future steps that we will take before installing the instrument in its final configuration at the IRAM telescope. The installation is planned for September 2015.