

Unveiling magnetic fields structures in galactic regions. NIKA2: the new continuum/polarized camera of the IRAM 30 m telescope

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Low resolution observations of dust polarisation (*Planck satellite*) have demonstrated that Galactic filamentary structures, where star formation takes place, are associated to well organised magnetic fields. High angular resolution polarisation observations will probe the physics acting at small angular scales and complete the current understanding of the star formation process: this is one of the main objectives of the NIKA2 instrument/collaboration/science program.

NIKA2 ([2018A&A...609A.115A](#)) is the new high resolution dual-band camera of the IRAM 30m telescope. Dual color imaging is obtained thanks to the simultaneous readout of a 616 pixel array at 2 mm (150 GHz) and 2x1140 pixel arrays at 1.15 mm (260 GHz). The two arrays at 1.15 mm combined to a continuously rotating half wave plate and a polarizer allows us to measure the linear polarization of the incoming light. While NIKA2 is currently operating in total power and offered to the community, the polarization channel is so far under commissioning that is expected to end in the incoming months.

NIKA, the NIKA2 pathfinder, revealed the capability of this technology to detect the polarization of galaxies as Cygnus-A and M87, weak quasars, supernova remnants as the Crab nebula and star forming regions, e.g. the Orion Molecular Cloud OMC-1. In particular, the observation of the polarization of the Crab nebula at 150 GHz allowed us to estimate for the first time the polarized spectral energy distribution (SED). The estimated SED index suggests synchrotron emission from a single population of relativistic electrons as the physical process responsible for the Crab polarized radiation. The Crab nebula is one of the most important calibration source for ground based telescopes and in particular for CMB experiments which have an angular resolution comparable to its size.

This contribution aims at presenting an overview of the NIKA polarization results and early results of NIKA2 camera as well.