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Superconducting Kinetic Inductance Detectors for kilopixel instruments at Radiotelescopes

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Kinetic Inductance Detectors (KID) is a novel detector technology based on superconducting resonators. Since their first demonstration in 2003, they have rapidly developed and are today a strong candidate for present and future experiments in the millimetric band of the electromagnetic spectrum. This has been possible thanks to the unique features of such devices. In particular, they couple a very high sensitivity to their intrinsic suitability for frequency domain multiplexed readout, a characteristic that is of paramount importance for all instruments needing large arrays of cryogenically cooled detectors. This is the case, for example, of many satellite borne experiment, as well as of ground-based telescopes with high resolution and a large field of view.

Among the instruments based on KID, NIKA (New IRAM KID Arrays) has been the first to conduct multiplexed on-sky observations. It has been permanently installed at the IRAM 30m telescope in Sierra Nevada (Spain) in 2012, and has since then carried several successful observation runs open to external astronomers. In June 2015, this camera will be replaced by the new, more powerful NIKA2 camera. In its final configuration, NIKA2 will have a total of approximately 5000 detectors. It will make simultaneous large field-of-view (instantaneous FoV = 0.1 deg) measurements at 2mm (150GHz) and 1.25mm (240GHz), with the latter channel being furthermore polarization sensitive.

Collaboration

NIKA collaboration

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