



SUBJECT

Large arrays of spectrally-sensitive Kinetic Inductance Detectors for ground-based Astronomy

CONTRACT

12 + 12 months postdoc contract, renewal after first year. Funded by “Université Grenoble Alpes” (UGA) under FOCUS contract

CONTACTS

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COLLABORATING LABORATORIES

Groupement d'intérêt Scientifique (GIS) KID : Institut Néel, LPSC, IRAM, IPAG

CONTEXT

Our group (Néel Astrophysics Instrumentation) is in charge of NIKA2 at Pico Veleta (30-meters télescope) and CONCERTO at APEX (Chile, 12 meters télescope). Both are state-of-the-art, multi-thousands pixels instruments based on the technologies developed in-house, i.e. Kinetic Inductance Detectors (KID) and dilution cryostats. For future experiments (possibly NIKA3 and CONCERTO2), we have an ongoing R&D for on-chip and off-chip low-resolution spectroscopy, or multi-band on-chip photometry. This in view of future high angular resolution surveys using KID. The main bands of operation will be the 1 mm (200-300 GHz) and 2 mm (120-180 GHz) atmospheric windows. We dispose of several microfabrication platforms, 2D and 3D EM simulation software and state-of-the-art laboratory instrumentation.

DESCRIPTION

The candidate will have a PhD in Physics, Astronomy or Engineering and have extensive experience in at least on of the following:

- **microfabrication processes**, with particular focus on: deposition of high-quality superconducting layers, lithography over large areas, manipulation of thin substrates;
- **electromagnetic simulations** related to detectors operating at mm and sub-mm wavelengths;
- **optical testing** at very low temperature, preferably using dilution cryostats.

The Institut Néel is running a microfabrication platform named “Nanofab”, and is actively participating in the PTA (Plateforme Technologie Amont) located within the CEA Grenoble compound. Both platforms, with all their equipment, will be available to the postdoc that we propose to hire. The collaborating IRAM laboratory is running its own microfabrication facility, dedicated to superconducting detectors. The person that will be hired will have unlimited access to the cryogenic and room-temperature testing instrumentation available at Institut Néel. Among those: three optical dilution cryostats with base temperature below 100mK, custom Martin-Puplett interferometer operating in the millimeter and sub-millimeter range (up to 3000 GHz frequency), sky simulator, monochromatic RF sources up to 325 GHz etc.

BIBLIOGRAPHY

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- The CONCERTO collaboration, “**CONCERTO at APEX: Installation and first phase of on-sky commissioning**”, arXiv:2110.14984 (2021)
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- The CONCERTO collab., “**A wide field-of-view low-resolution spectrometer at APEX: Instrument design and scientific forecast**”, *Astronomy & Astrophysics* 642, A60 (2020)
- R. Adam et al., “**The NIKA2 large-field-of-view millimetre continuum camera for the 30m IRAM telescope**”, *Astronomy & Astrophysics* 609, A115 (2018)
- A. Monfardini et al., “**A dual-band millimeter-wave KID camera for the IRAM 30m telescope**”, *The Astrophysical Journal Supplement* 194, Issue 2, 24 (2011)
- A. Catalano et al., “**LEKID sensitivity for space applications between 80 and 600GHz**”, *Astronomy & Astrophysics* 641, A179 (2020)