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CSO SPECIAL SCIENCE SEMINAR

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TIME: 04:00 PM, Monday 9th of May 2011

PLACE: CSO Conference Room

TITLE: The Multiwavelength Submillimeter Inductance Camera (MUSIC): A New Facility Instrument at the CSO

SPEAKER: Nicole Czakon

Department of Physics, California Institute of Technology

ABSTRACT:

An insatiable appetite for large-format, kilo-pixel arrays in the millimeter/submillimeter astrophysics community has motivated the development of a novel detecting element--the millimeter-wave kinetic inductance detector (MKID). Our team is in the final stages of constructing an MKID camera called MUSIC. The camera will have 576 spatial pixels, each simultaneously sensitive to four wavelengths: .87, 1.0, 1.3, and 2.0 mm. An MKID uses a low gap-energy superconducting film to provide the inductive contribution to a resonant LC circuit. As the superconductor absorbs photons, its kinetic inductance changes, and detection occurs by monitoring the resulting shift in resonant frequency. By tuning each detector to a different frequency, hundreds of MKIDs can be coupled to a single microwave transmission line. Readout complexity is thus transferred to room temperature, where we have developed an FPGA-based readout, thanks, in part, to hardware and software from the CASPER-ROACH collaboration. Commissioning at the CSO is expected to begin in Winter 2011/2012. I will review the principles of MKID theory and design, how we read them out, and give an update on the current status of the instrument.

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Caltech Submillimeter Observatory (CSO) 111 Nowelo Street, Hilo HI 96720 (Phone: (808) 935-1909) Hilo office is located in the University Park, at the corner of Komohana – Nowelo Street.