
# Development of the rf-SQUID based multiplexing system for the HOLMES experiment

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Measuring the neutrino mass is one the most compelling issues in particle physics.
The European Research Council has recently founded HOLMES, a new experiment for a direct measurement of neutrino mass. HOLMES will perform a precise measurement of the end point of the Electron Capture decay spectrum of 163Ho in order to extract information on neutrino mass with a sensitivity as low as 0.4 eV.
HOLMES, in its final configuration will deploy a 1000 pixel array of low temperature microcalorimeters: each calorimeter consists of an absorber, where the Ho atoms will be implanted, coupled to a Transition Edge Sensor thermometer. The detectors will be kept at the working temperature of ~90 mK using a dilution refrigerator. To read out 1000 or more detectors inside a cryostat is no trivial matter: at the moment, the most appealing read out technique applicable to large arrays of Transition Edge Sensors is rf-SQUID multiplexing. It is based on the use of rf-SQUIDs as input devices with flux ramp modulation for linearisation purposes; the rf-SQUID is then coupled to a super-conductive LC resonator in the GHz range, and the modulated signal is finally read out using the homodyne technique.
In our contribution we outline the performance and special features of the multiplexing system and readout methods chosen for HOLMES.