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Microwave multiplex read out for superconducting sensors

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The calorimetric measurement of the energy released in a nuclear beta decay is a powerful tool to determine the effective electron-neutrino mass. In the last years, the progress on low temperature detector technologies has allowed to design large scale experiments aiming at pushing down the sensitivity on the neutrino mass below 1 eV. Even with outstanding performances in both energy (~ eV on keV) and time resolution (~ 1 microsecond) on the single channel, a large number of detectors working in parallel is required to reach a sub-eV sensitivity. Microwave frequency domain read out is the best available technique to read out large array of low temperature detectors, such as Transition Edge Sensors (TESs) or Microwave Kinetic Inductance Detectors (MKIDs). This microwave multiplexing system will be used to read out the HOLMES detectors, an array of 1000 microcalorimeters based on TES sensors in which the ^{163}Ho will be implanted. HOLMES is a new experiment for measuring the electron neutrino mass by means of the electron capture (EC) decay of ^{163}Ho .

We present here the microwave frequency multiplex which will be used in the HOLMES experiment and the microwave frequency multiplex used to read out the MKID detectors developed in Milan as well.

Collaboration

on behalf of HOLMES collaboration

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