

Poster

PTOLEMY: TES Microcalorimeters for Detection of the Cosmic Neutrino Background

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We will discuss a concept for a new implementation of Transition Edge Sensors for detecting the Cosmic Neutrino Background (CvB). The experiment, called PTOLEMY (Princeton Tritium Observatory for Light, Early-Universe, Massive-Neutrino Yield), will look for the capture of CvB neutrinos on Tritium which has a distinct signature of producing a mono-energetic line of betas above the beta-decay endpoint. Through the use of a large area surface-deposition tritium target and a MAC-E-Filter (Magnetic Adiabatic Collimation combined with an Electrostatic Filter), PTOLEMY will remove ~ 18.5 keV of kinetic energy from the emitted betas leaving only the electrons near the decay endpoint with ~ 100 eV of kinetic energy. A large array of TES calorimeters will provide a high resolution measurement of these remaining betas. For 100 eV betas, a resolution of ~ 0.17 eV would be sufficient for detecting the CvB if the neutrino masses are larger than 0.34 eV.