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The phonon mediated TES cosmic ray detector for focal plane of ATHENA x-ray Telescope

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The next generation of micro-calorimeter arrays for X-Ray Space Telescopes will expose thousands TESs and their absorbers to cosmic particles. An anticoincidence detector is necessary, because cosmic rays mimic the expected physical signals of x-rays from astrophysical sources. This anticoincidence detector must be operated at 50mK, the same environment of the X-ray micro-calorimeter array by GSFC-NASA. I will outline its design and the physics of the signal generation by means of a simulation of phonon dynamic. This work has been done into the framework of the anticoincidence development for the X-IFU instrument inside ATHENA mission project. The detector structure is based on micro-machined silicon chip whose absorber is supported by small silicon beams. Energetic charged particles have been simulated to deposit their energy in a small hot spot. In order to maximize the detection efficiency of the emerging quasi-diffusive phonon burst, we have uniformly distributed 96 TESs on one silicon side. Each has $50 \times 250 \mu\text{m}^2$ area and 200-nm-thick IrAu bilayer. They are parallel connected to a single SQUID readout channel. Fabrication and performance tests will be also presented.

Less than 5 years of experience since completion of Ph.D

N

Student (Ph.D., M.Sc. or B.Sc.)

N

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