



Common bias readout for TES array on Scanning Transmission Electron Telescope

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Transition edge sensor (TES) microcalorimeter array as an X-ray sensor for a Scanning Transmission Electron Telescope (STEM) system is being developed (Maehata et al., in this workshop). The technical challenge of this system is a high count rate of ~ 5000 photons/seconds and a small detector stage on a cold finger. We adopted a 64 pixel array, by a parallel readout. Common SQUID bias, and common TES bias are planned to reduce the number of wiring and the resources of room temperature circuit. The reduction rate is 44% when a 64 pixel array is read out by common bias of 8 pixels. The common bias readout has to be extended only to the circuit of single pixel readout. The possible degradation of energy resolution has been investigated by simulations and experiments. The noise and crosstalk of a series connection of bias line is less than those of a parallel connection. Given the performance of our TES and SQUID, the crosstalk of common SQUID bias and common TES bias in a series connection are 10^{-5} % and 0.15 %, respectively. These values have no effect at all to the requirement of STEM system. We constructed the 8 SQUIDs which are connected 8 TES output and are biased by a common line and room temperature circuit for common bias readout. In this presentation, we report the verification of the common bias method for 64 pixels and the experimental results of 8 channel readout.