Contributed Talk

Superconducting Bolometer Design Adaptations for Very Different Applications

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We have designed and tested bolometer thermal isolation structures and superconducting transition edge sensors envisioned as spanning a broad range of long wavelength astronomical applications. At the high background limit, for instruments such as BETTII and HAWC+, saturation powers of several hundred picoWatts are required, permitting higher noise (of over 10^{-16},W/√Hz). At the low background limit, for instruments such as PIPER, a saturation power of only 1∼pW is sufficient, and low noise (of 5×10^{-18}, W/√Hz) is required. We have measured the thermal performance of silicon leg-isolated membranes that can span this entire range with the modification of few design parameters. We have also come up with a quasistable G(T) measurement approach that does not require thermal parameters to be derived from dynamic IV curves. We present our progress on kilopixel-scale arrays for four projects that rely on these techniques.