

HEB Device Development for a Submillimeter Heterodyne Array Camera

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We are developing Nb HEBs for a large-format, diffusion-cooled hot electron bolometer (HEB) array submillimeter camera. The goal is to produce a 64 pixel array together with the University of Arizona to be used on the HHT on Mt Graham. It is designed to detect in the 850 GHz atmospheric window. We have fabricated Nb HEBs using a new angle-deposition process, which had previously produced high quality Nb-Au bilayer HEB devices at Yale. [1] We have characterized these devices using heterodyne mixing at ~30 GHz to compare to 345 GHz tests at the University of Arizona. We can also directly compare our Nb HEB mixers to SIS mixers in this same 345 GHz system. This allows us to rigorously calibrate the system's losses and extract the mixer noise temperature in a well characterized mixer block, before undertaking the 850 GHz system. Here we give a report on the initial devices we have fabricated and characterized.

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