

BLAST - A NEW BALLOON-BORNE SUBMILLIMETER TELESCOPE

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BLAST – a Balloon-borne Large Aperture Submillimeter Telescope – will have three detector arrays operating at 250, 350, and 500 microns, with 149, 88, and 43 detectors respectively. The detectors will be silicon nitride micromesh (“spiderweb”) bolometers coupled to the telescope via $2f\lambda$ feedhorns. A helium-3 absorption refrigerator will cool these bolometers to 300 mK so that the receiver’s noise (NEFD) will be dominated by photon shot noise from the telescope and atmospheric emission. Because of the high (35 km) altitude of balloon observations, this atmospheric noise will be low and we expect NEFDs less than $240 \text{ mJy/Hz}^{1/2}$ in all channels.

The first test flight will be in N. America and will last 6–24 hours. Later we will carry out long duration (14 days) balloon flights around the south pole. For the test flight we will use a 2.1 m spherical mirror, giving diffraction limited resolutions of 30, 41 and $59''$ at the three frequencies. With these resolutions BLAST will be able to work on astronomical problems as close as nearby stars and as far away as the beginnings of the Universe. Our group has started work on a cryogen-free bolometer camera for the new 100 m Green Bank telescope and a brief description of this instrument will be given.