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Feedhorn-coupled TiN Kinetic Inductance Detectors for the BLAST-TNG Submillimeter Polarimeter

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We are developing kinetic inductance detectors optimized for polarimetry at 250, 350, and 500 μm wavelengths with 30% fractional bandwidth. These microwave kinetic inductance detectors (MKIDs) utilize a trilayer TiN/Ti/TiN that is tuned to a superconducting transition temperature of 1.4 K. A test pixel array of 250 μm single polarization-sensitive MKIDs, via a variable temperature blackbody load, demonstrate that these detectors behave as photon noise limited with incident optical power above 0.5 pW. In the final array design, each feedhorn has two single-polarization sensitive MKIDs that are crossed via an oxide barrier with aluminum bridges. These bridges have

been shown to leave the intrinsic noise of the MKID unperturbed. We will also present several optical characterization measurements of the detectors, such as frequency passband, beam profile, and polarization efficiency. The final 757, 367, and 163 feedhorn-coupled pixel arrays at 250, 350, and 500 μm, respectively, will be deployed on the December 2016 Antarctic flight of the next generation Balloon-borne Large Aperture Submillimeter Telescope (BLAST-TNG).