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Potential methods for stray-light suppression in antenna-coupled LEKIDs

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Arrays of lumped-element kinetic inductance detectors (LEKIDs) optically coupled through an antenna and transmission-line structure are a promising candidate for future cosmic microwave background (CMB) experiments. Using the separated architecture of a LEKID enables optical coupling to be realised, without the detector becoming susceptible to two-level system noise created by the amorphous-dielectric requirements of a simple microstrip feedline structure. Through initial investigations of small prototype arrays, we have shown this compact device architecture can produce intrinsic quality factors > 10^5, allowing for MUX ratios to exceed 10^3. Moreover, we have demonstrated that these devices are limited by generation-recombination or photon noise down to low modulation frequencies proving the devices are not susceptible to the fabrication requirements of any antenna feed or filtering network the device is coupled to. However, this optical configuration is highly susceptible to a reduction in sensitivity due to stray light. Here we discuss our investigation into a suitable method of stray-light suppression based on the addition of an absorbing layer compatible with our device design and present the current performance of our prototype devices.

Less than 5 years of experience since completion of Ph.D

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