

Abstract Submitted  
for the APR20 Meeting of  
The American Physical Society

**Capacitive Distance Sensing for CMB Instrumentation** ETHAN

LU<sup>1</sup>, University of California, Berkeley — A capacitive distance sensor is being developed for measuring the position of a levitating half-wave plate, with a target resolution of .1mm. In addition to designing the sensor PCB, software is written for calibration, distance conversion, and real-time visualization. There are two main challenges to accurate distance conversion. First of all, many uncontrollable conditions that can change the amount of ground in the surroundings of the sensor, such as whether a person is nearby, may be serious sources of interference. An environmental reading can be used to subtract out the interference to a large extent, but the effect can also be reduced by means like active shielding. Secondly, capacitance depends on the particular geometry. However, it is hard to directly test and calibrate inside the actual instrument or create an authentic replica for testing. Therefore, a combined approach can be taken for calibration, such that a mock setup is used to extract those parameters which are easier to replicate, while others are calibrated using some simple procedure in situ.

<sup>1</sup>With help and supervision from Akito Kusaka and Peter Ashton

Ethan Lu  
University of California, Berkeley

Date submitted: 10 Jan 2020

Electronic form version 1.4