Abstract Submitted for the CAL12 Meeting of The American Physical Society

KAPAO Prime: Design and Simulation LORCAN MCGONIGLE, Pomona College — KAPAO (KAPAO A Pomona Adaptive Optics instrument) is a dual-band natural guide star adaptive optics system designed to measure and remove atmospheric aberration from Pomona College's telescope atop Table Mountain. We present here, the final optical system, referred to as Prime, designed in Zemax Optical Design Software. Prime is characterized by diffraction limited imaging over the full 73" field of view of our Andor Camera at f/33 as well as for our NIR Xenics camera at f/50. In Zemax, tolerances of 1% on OAP focal length and off-axis distance were shown to contribute an additional 4 nm of wavefront error (98% confidence) over the field of view of the Andor camera; the contribution from surface irregularity was determined analytically to be 40nm for OAPs specified to 1/10 surface irregularity. Modeling of the temperature deformation of the breadboard in Solid-Works revealed 70 micron contractions along the edges of the board for a decrease of 75° F; when applied to OAP positions such displacements from the optimal layout are predicted to contribute an additional 20 nanometers of wavefront error. Flexure modeling of the breadboard due to gravity is on-going. We hope to begin alignment and testing of "Prime" in Q1 2013.

> Lorcan McGonigle Pomona College

Date submitted: 29 Sep 2012

Electronic form version 1.4