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Using Stars to Align a Steered Laser System for Cosmic Ray Simulation HARRY KRANTZ, LAWRENCE WIENCKE, Colorado School of Mines — Ultra high energy cosmic rays (UHECRs) are the highest energy cosmic particles with kinetic energy above $10^{18}eV$. UHECRs are detected from the air shower of secondary particles and UV fluorescence that results from interaction with the atmosphere. A high power UV laser beam can be used to simulate the optical signature of a UHCER air shower. The Global Light System (GLS) is a planned network of ground-based light sources including lasers to support the planned space-based Extreme Universe Space Observatory (EUSO). A portable prototype GLS laser station has been constructed at the Colorado School of Mines. Currently the laser system uses reference targets on the ground but stars can be used to better align the beam by providing a complete hemisphere of targets. In this work, a CCD camera is used to capture images of known stars through the steering head optics. The images are analyzed to find the steering head coordinates of the target star. The true coordinates of the star are calculated from the location and time of observation. A universal adjustment for the steering head is determined from the differences between the two pairs of coordinates across multiple stars. This laser system prototype will also be used for preflight tests of the ESUO Super Pressure Balloon mission.

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