The Optical Train

- A 3D CAD model of the beam combiner and a beam train schematic for the beam combiner shown above.
- Figure 3. A 3D CAD model of the beam combiner and a beam train schematic for the beam combiner shown above.

Beam Combiner Candidate Designs

- There are four candidate designs for the beam combiner, each with unique features and potential advantages.

The Fast Switchyard

- The term “fast switchyard” is used to describe a stack of slides that automatically selects and allows a given telescope to form an image using a given optical path.
- The switchyard layout incorporates the use of optical elements consisting of dichroic and mirrors mounted on mechanically actuated slides.
- The switchyard slide movement involves moving the optical elements to minimize wavefront distortions.

The Repeatability Difference in mm at Each Position

- Figure 9. Chart showing the repeatability difference in mm at each position.

Results of Phase I and Phase II Slide Tests

- Figure 10. Chart showing the results of Phase I and Phase II slide tests.

Slide Characterization for an Interferometric Beam Combiner

Abstract

The Magdalena Ridge Observatory Interferometer (MROI) is being constructed atop the Magdalena Ridge at an altitude of 3,320 meters. The telescope array consists of 15 baselines and 20 closure paths for the six telescopes.

The Fast Switchyard

- The fast switchyard slide is designed to select a path of slides that automatically selects and allows a given telescope to form an image using the desired optical path. The switchyard layout incorporates the use of optical elements consisting of dichroic and mirrors mounted on mechanically actuated slides.

Fast Switchyard Slide Experimental Setup and Test Procedures

- The fast switchyard slide experimental setup includes a series of metrology detector readings at known increments of time over the course of 24 hours.

Figure 11. Chart showing the results of the fast switchyard slide experimental setup.

Figure 12. Chart showing the results of the fast switchyard slide test procedures.

Figure 13. Chart showing the results of the fast switchyard slide test procedures.

Figure 14. Chart showing the results of the fast switchyard slide test procedures.

Results of Phase I and Phase II Slide Tests

- Figure 15. Chart showing the results of Phase I and Phase II slide tests.

Pitch Yaw Results for Phase II

- Figure 16. Chart showing the pitch yaw results for Phase II.

Temperature (°C)

- Figure 17. Chart showing the temperature results for Phase II.