DFTfringe data fitting for collimating a pair of 1 meter diameter 413 nm beams which interfere to expose diffraction gratings.

This interferometer and data processing replaces human judgment when observing a collimation focal spot that shakes and thus had not been quantified. The overall design enables using the 413 nm aspheric lens design at other wavelengths, that would otherwise have spherical aberration without the addition of an optimally placed “off the shelf” Plano convex lens.

**AutoCAD by Dempsey**

**Siskiyou Corporation built the Interferometer**

**Future use of the interferometer**

Monitor systematic drifts. Inspect optical wave front anomalies. Test optic up to 1 meter diameter making this the largest aperture interferometer at LLNL.

Measure spherical aberration, given a flat mirror covering at least half meter or data stitching. Then adjust the Plano Convex lens placement to minimize wave front aberrations. Otherwise there could be deviation from straight line interference patterns from two “collimated” beams.

**Excel plot of DFTfringe fits as change the Edmund Aspheric Lens position**

No averaging (first data file only) | Likely use case when adjusting lens focus. All the way increased and decreased. 3SD of data is clear winner.

**Model simulated sensitivity to see a known lens fabrication defect often found on lens center**

Detected 50 nm bump on the first surface of 100 mm OD Grating exposure lens

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