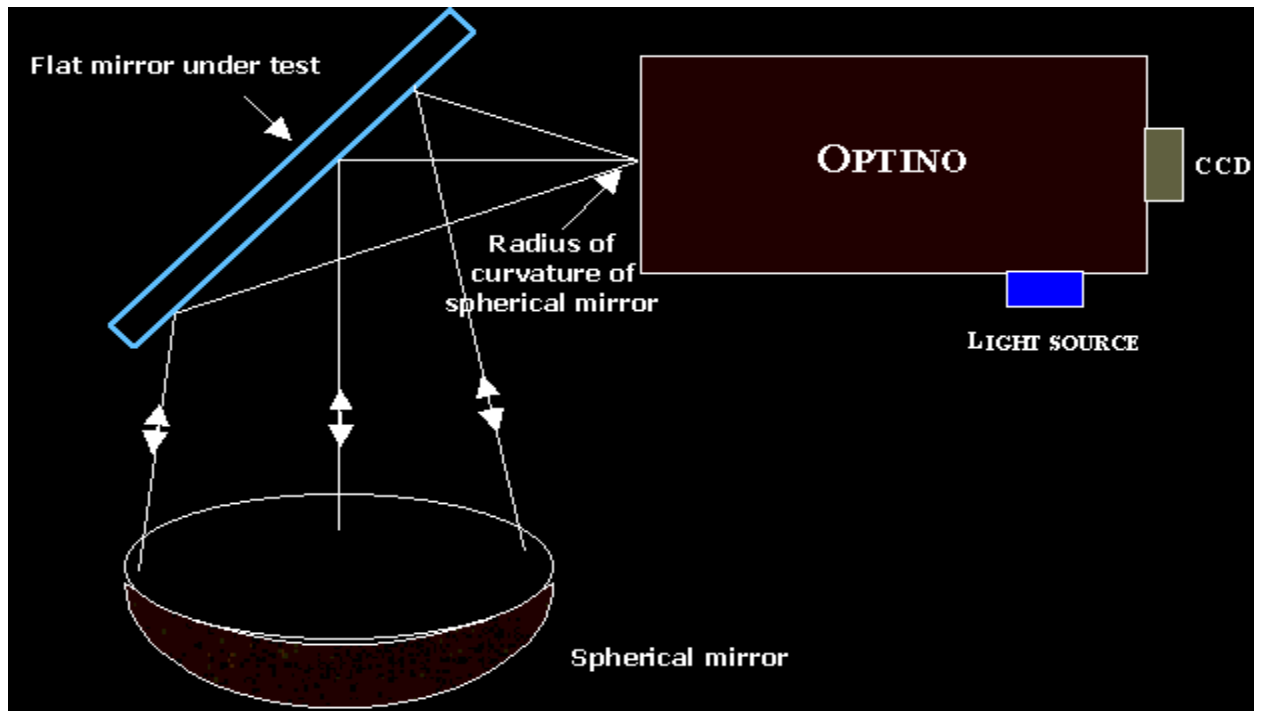


Shack-Hartmann wavefront sensor test of a flat mirror



Setup: The Ritchey-Common configuration is used for testing a flat mirror, in conjunction with a spherical mirror.

First the SH frame of the spherical mirror is obtained directly: this becomes the calibration frame. Then the SH frame of the flat + spherical mirror is obtained, using the configuration shown above. Then the analysis proceeds in the usual way, thus giving the optical quality of the flat mirror alone.

Clearly, since the aberrations of the spherical mirror are removed by the calibration process, it does not need to be of a very high quality.

In the above configuration, the spherical mirror has been placed at an angle of 90 degrees. Other angles can be also used.

Instrument:

Optino :Focal ratio range: $f/1$ to $f/500$.

Output:

Sensoft gives the Zernike coefficient, the wavefront and optical quality of the flat mirror.



How the test is done

The Shack-Hartmann test is simple to perform: first a CCD Shack-Hartmann frame of the optical element being tested is taken. Then a reference CCD Shack-Hartmann frame is taken, using an internal calibration source. That's all that is required by the Sensoft, the reduction software. All instruments come complete with the calibration source.

1. Mount Optino on a suitable optical bench.
2. Under remote control from the PC, take the reference calibration frame, using the inbuilt light source.
3. Mount the optical element being tested in the configuration which is suitable for the test (lens, spherical mirror, flat mirror etc.)
4. Take the Shack-Hartmann image of the optical element.
5. Do the Analysis using Sensoft. The results are ready in about 10 seconds.
6. If required, take multiple SH frames for reducing noise.
7. Run Analysis. Sensoft automatically computes the average values.
8. Align the optical elements (if it's a multi-element system) using the indications given by Sensoft.
9. Find the correct focal plane using the indications given by Sensoft.
10. Correct support problems using the plots of the wavefront/mirror surface.

Requirements:

Instrument	Optino
Focal ratios covered	f/0.5 to f/500 standard.
Sampling on the pupil	25x25 spots standard. Up to 65x65 spots can be used.
Analysis Software	Sensoft Optino
CCD for SH	8-bit un-cooled or 16-bit cooled CCD.