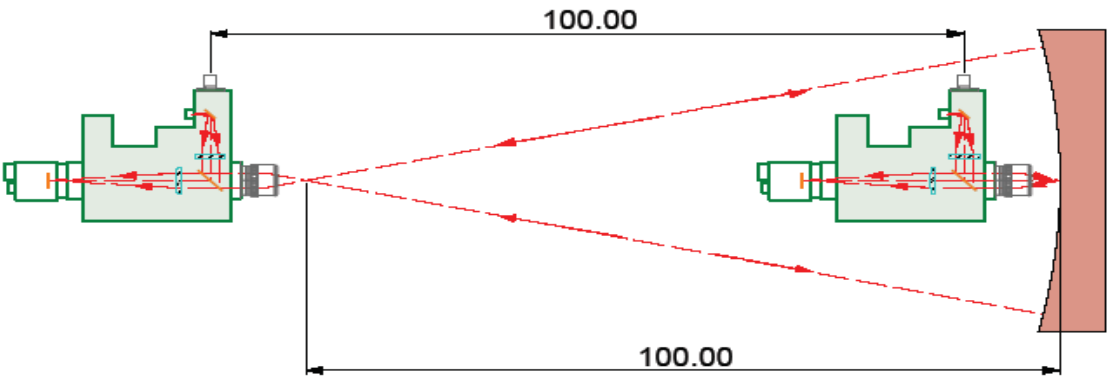
PSM Application Note

Measurement of Radius of Curvature

The most basic use for the Point Source Microscope (PSM), or any autostigmatic microscope, is the measurement of the radius of curvature of concave surfaces.

To do the measurement, the PSM is attached to a rail that incorporates a linear scale. The concave surface to be measured is placed at one end of the rail in a tip/tilt mount. The PSM produces a well focused spot of light at the objective focus. This spot of light will be reflected back towards the microscope from the concave surface. The basic set up for the test is shown in the picture.



When the microscope is moved to close to the radius of the surface the reflected spot of light will be easily seen on a white piece of paper placed near the objective. By tilting the surface and adjusting the distance to the surface the reflected spot will enter the objective and be seen on the video screen of the PSM. Further fine adjustment will center the spot on the video screen and minimize the spot diameter indicting best focus.

At this point a reading is taken from the linear scale. Then the PSM is moved toward the surface until the objective is focused on the surface as in the right hand position in the picture. Again, the distance to the mirror is adjusted to reduce the spot to a minimum diameter. Not the that spot will be in the middle of the screen because this is the so called “Cat’s Eye” reflection position. Again, when the spot is a minimum size a reading is taken from the scale.

The difference in the two readings is the radius of curvature of the surface. The readings should be taken in the order given here, center of curvature first and Cat’s Eye second because movement from the center of curvature has to be along a normal to the surface. The radius can be measured to at least 10 µm or better.