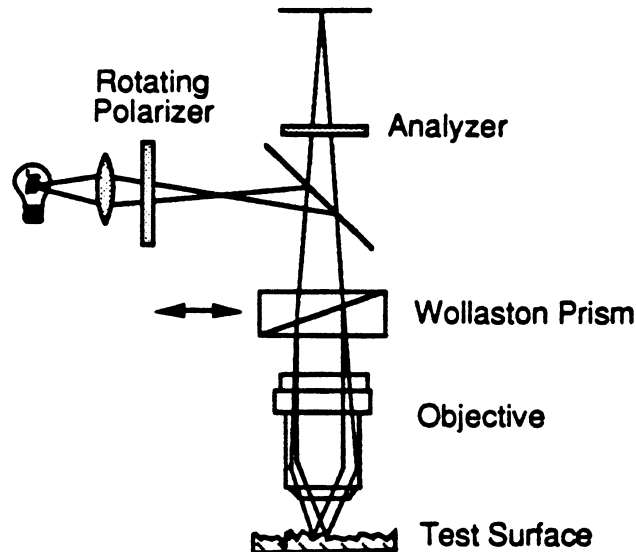


Nomarski Microscope

The diagram below shows a drawing of the optical layout of a Nomarski microscope. The Nomarski microscope is sometimes called a differential interference contrast (DIC) microscope or a polarization interference contrast microscope.



A polarizer after a white light source is used to set the angle of the polarized light incident upon a Wollaston prism. The Wollaston splits the light into two beams having orthogonal polarization, which are sheared with respect to one another. After reflection off the test surface the Wollaston recombines the two beams. A fixed analyzer placed after the Wollaston transmits like components of the two polarizations and generates an interference pattern.

The resulting image shows the difference between two closely spaced points on the test surface. The point separation (shear at the test surface) is usually comparable to the optical resolution of the microscope objective and hence only one image is seen. The image shows slope changes and it appears as though the surface has been illuminated from one side. Like all shearing interferometers, only slope changes in the direction of the shear are seen.

The path difference between the two beams can be adjusted by laterally translating the Wollaston prism. When the axes of the polarizer and analyzer are parallel and the prism is centered, the path lengths are equal and white light is seen for a perfect test surface with no tilt. When the polarizer and analyzer are crossed and the prism centered, no light gets through. When the prism is translated sideways, the two beams have unequal paths and different colors are seen. The color for a specific feature on the test surface depends upon the path difference between the two beams for that point. A constant slope will give a constant color. A color change indicates a change in the surface slope. When the polarizer before the prism, or the analyzer before the detector, is rotated, the relative intensities of the two orthogonal polarized beams change, and the colors and contrast change.