

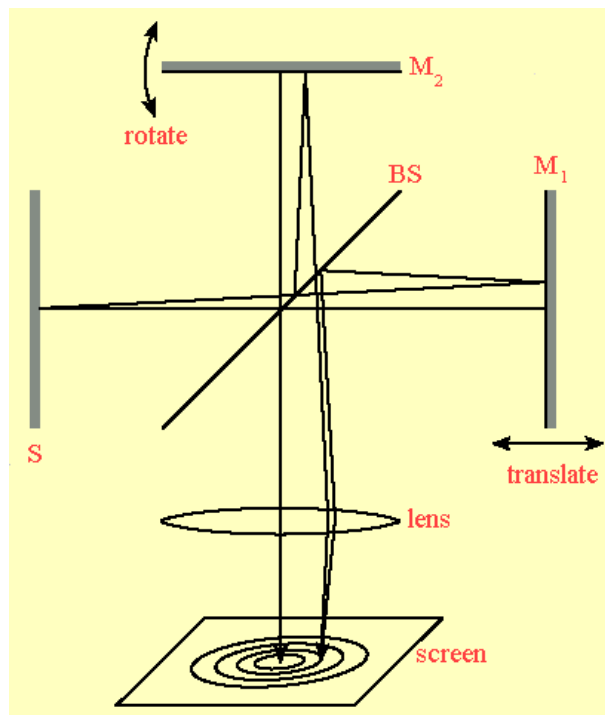
Answer on Question #64292, Physics / Optics

What is the interferometer?

Solution:

Interferometer, an instrument that uses the interference patterns formed by waves (usually light, radio, or sound waves) to measure certain characteristics of the waves themselves or of materials that reflect, refract, or transmit the waves. Interference patterns are produced when two identical series of waves are brought together. The interference patterns generated by interferometers contain information about the object or phenomenon being studied.

Widely used today, interferometers were actually invented in the late 19th century by Albert Michelson. The Michelson interferometer is an optical instrument of high precision and versatility. It is generally used in investigations that involve small changes in optical path length. With the Michelson interferometer, one can produce circular and straight-line fringes of both monochromatic light and white light. One can use these fringes to make an accurate comparison of wavelengths, measure the refractive index of gases and transparent solids, and determine small changes in length quite precisely.



In its most common arrangement, a Michelson interferometer is illuminated by an extended source *S* and consists of a 50% beam-splitter *BS* and two mirrors *M*₁ and *M*₂. The interference pattern is observed on a screen that is either very far from *BS*, or a lens is placed one focal length in front of the screen. Rotation or translation of one or both mirrors changes the interference pattern.

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