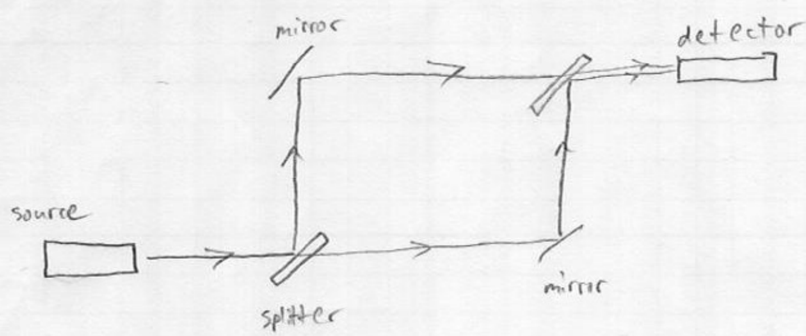
Coherent light comes in from the side, generally from a laser or (historically) a vapor lamp. The light hits a 50/50 beamsplitter (generally a partially silvered mirror) and heads off in two directions, following one of two interferometer "arms".

There are high reflectors at the ends of each arm, and sometimes a compensator plate to make sure that each beam goes through the same amount of glass.

Eventually the beams recombine and hit a detector. If each beam followed an identical path, they'll reach the detector in phase and you'll get constructive interference. But if you make one of the path lengths longer than the other, you could easily arrange destructive interference. Sometimes the mirror for one arm will be on a moveable platform, for example.

Knowing the wavelength of the source lets you measure small changes in distance by counting bright and dark fringes as those changes happen. Or, if you know by how much you're moving the mirror, you can again measure wavelength. This can be an extremely accurate process.

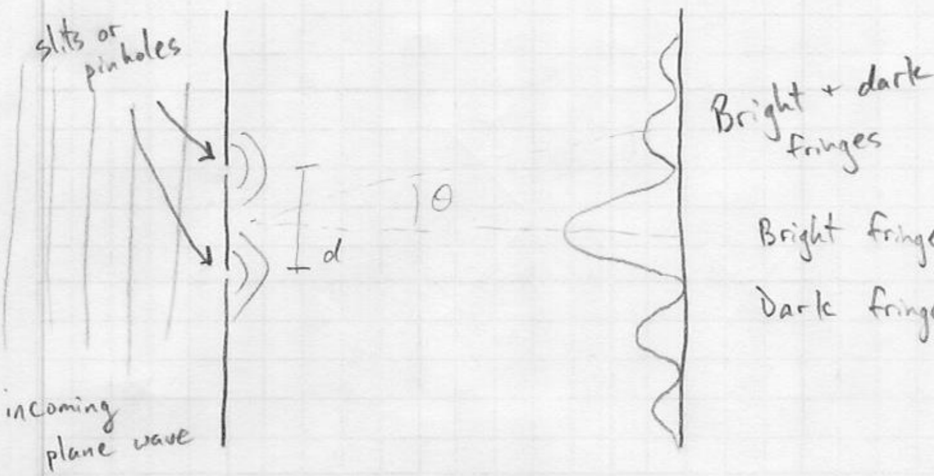
A very similar interferometer that has found a lot of practical use is the Mach-Zehnder:



It's very similar to the Michelson interferometer, except that the two arms are kept totally distinct. It's a bit more finicky to align as a result, but it's a handy configuration for characterizing semitransparent things like plasmas, airflows, and other fluids. Put, for example, a flame in one arm, and the varying index of refraction of that flame will lead to optical path length differences and an interference pattern that provides a lot of information about the flame (and in a very noninvasive way, at that).

Interferometry

Any device that can produce interference can be referred to as an interferometer. Perhaps the first of these was Young's double slit device.



Bright fringes when $2d\sin\theta = m\lambda$

Dark fringes when $2d\sin\theta = (m+\frac{1}{2})\lambda$

Young was trying to demonstrate the wave nature of light. Nobody could get two independent light sources to interfere since, as we now know, they're generally incoherent with respect to one another. What Young did was to take a screen and make two tiny pinholes in it, and shine light on those pinholes. What came out the other side was two correlated sources, which could then interfere. The interference pattern was clearly visible on another nearby screen.

Measuring the locations of the bright and dark fringes lets you recover the wavelength of the light, giving an immediate application to even this simplest of interferometers.

Since then we've come up with more sophisticated interferometers, like the Michelson interferometer of Michelson-Morley fame: