

A Simple Interference Experiment of Polarized Light Using Polarization Interferometer

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Abstract

It has been more than 200 years since Thomas Young discovered light interference. After all this time, physicists still have a tough time producing phase differences in their interferometer. The root of this problem is the moving of an arm of the interferometer to create phase differences. In nature, the coherence length of light is extremely small so when they move the arm it has already out of the range. Therefore, this modified polarization interferometer has been setup. It does not require users to move any arms because it uses a quarter-wave plate as a phase shifter. By putting the quarter-wave plate in front of the interferometer and turning it around on the vertical axis to change the thickness of the quarter-wave plate that the light passes through, users can create easily a number of phase differences for their experiment. The experiment was carried out by adjusting the wave plate with various angles. The result showed that the intensity of interference fringes detected at the last part of the interferometer changed at the same time. It means that this interferometer can be used very well to produce phase differences. It is expected that this interferometer can be also used with a short coherence of a light source in the future.

Keywords: polarization interferometer, quarter-wave plate, coherence length of light