Waveplates (Phase Retardation Plates) Brief Overview

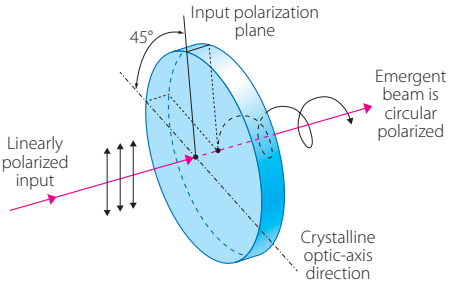
Altechna offers wide range of zero order (ZO), low order (LO) half (λ/2) or quarter (λ/4) waveplates for UV, VIS, NIR and IR (for any wavelength in 240-9000 nm range).

Waveplates are made from materials which exhibit birefringence. The velocity of the extraordinary and ordinary rays through the birefringent material varies inversely with their refractive indices. This difference in velocities gives a rise to phase difference. At any specific wavelength the phase difference is governed by thickness of the waveplate.

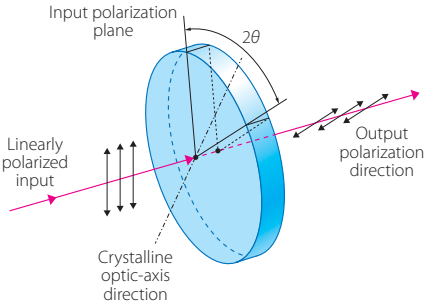
Half (λ/2) waveplate. A linearly polarized beam incident on a half wave crystal quartz waveplate emerges as a linearly polarized beam but rotated such that its angle to the optical axis is twice that of the incident beam. Therefore, half-waveplates can be used as continuously adjustable polarization rotators. Half-waveplates are used in eletrooptic modulation, as a variable ratio beamsplitter when used in combination with a thin film polarizer or polarizing cube, or in general to rotate the plane of polarization.

Quarter (λ/4) waveplate - thin-film compensator. If the angle between the electric field vector of the incident linearly polarized beam and the retarder principal plane of the quarter-waveplate is 45 degrees, the emergent beam is circularly polarized. When a quarter waveplate is double passed, i.e. by mirror reflection, it acts as a half waveplate and rotates the plane of polarization to a certain angle. Quarter waveplates are used in creating circular polarization from linear or linear polarization from circular, ellipsometry, optical pumping, suppressing unwanted reflection and optical isolation.

Performance of quarter (λ/4) waveplate



Performance of half (λ/2) waveplate



Features

- Waveplates for any wavelength in the 240-9000 nm range
- Air-spaced ZO waveplates for high energy applications
- Waveplates for many wavelengths are available from stock
- Custom design waveplate assemblies are available on request

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