Reflection and Refraction

Reflection and Polarization
Polarization by scattering

Polarization by reflection
- Unpolarized light can be polarized by reflection at an angle from a dielectric surface.
- The reflected light is completely polarized at a special angle “Brewsters angle”
- If the incident light is polarized with the E field in the plane of incidence, then at Brewsters angle no light is reflected. All the light is transmitted.

Question
Suppose you wanted to have a polarized light beam to be completely transmitted at the air water interface. What conditions would you use?

Brewster’s angle
Polarizing angle

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Suppose you wanted to have a polarized light beam to be completely transmitted at the air water interface. What conditions would you use?

Light with E field in the plane of incidence Angle of incidence equal to the polarizing angle

\[ \tan \theta_p = \frac{n_2}{n_1} \]

\[ n_1 = 1.00 \]

\[ n_2 = 1.333 \]

\[ \theta_p = 53^\circ \]
Unpolarized light incident at the polarizing angle is polarized on reflection.

Polarization by reflection

- no filter
- polarizing filter