

Polarization of Photonic Light

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Abstract

Polarization of light is the process of converting a non-polarized light into a polarized light. In this paper a model of polarization of photonic light has been presented.

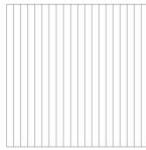
Keyword : Polarization of photonic light.

1 SHAPE OF A PHOTON

Let's assume that the shape of a photon is spheroidal.

2 POLAROID

A polaroid is a sheet which has the ability to polarize light. The pass-axis of a polaroid is the direction for which the unpolarized light becomes linearly polarized. For a vertical pass-axis polaroid a vertical arrangement of atoms or molecules will behave like a stretchable string.



A polaroid with vertical pass-axis

3 PRINCIPAL MAJOR AXIS OF A PHOTON AND PHOTONIC ANGLE

A major axis of a photon whose projection, on the plane of a polaroid sheet, makes the largest angle ($0^\circ \leq \theta \leq 90^\circ$) with the pass-axis of a polaroid is a principal major axis of a photon and the corresponding angle θ is the photonic angle.

4 MEANING OF POLARIZATION OF PHOTONIC LIGHT

Polarization of photonic light, ideally, means the transmission of photons making their photonic angle equal to zero. A polaroid will easily transmit photons having their photonic angle equal to zero whereas the transmission will decrease gradually as the photonic angle increases and the transmission will become negligible as the photonic angle becomes 90° .

5 MALUS' LAW OF POLARIZATION

Consider two polaroids both placed perpendicular to a beam of light, then

$$I = I_o \cos^2 \phi$$

where

I = intensity of polarized light transmitted by the second polaroid

I_o = intensity of polarized light transmitted by the first polaroid

ϕ = angle between the pass-axes of the first polaroid and the second polaroid

References

1. Hugh D. Young, Roger A. Freedman, Albert Lewis Ford, "*Sears' and Zemansky's University Physics with Modern Physics 13th edition.*"