Homework Anisotropic Media

rendre Code + Rapport

The Jones Matrix of a twisted nematic liquid crystal cell is given by

$$M(\beta)=\begin{pmatrix}\cos\alpha & -\sin\alpha\\ \sin\alpha & \cos\alpha\end{pmatrix}\begin{pmatrix}X-iY & Z\\ -Z & X+iY\end{pmatrix}$$

A B

$$\alpha=\frac{\pi}{2} \qquad \beta\in[0,2\pi]$$

$\frac{\pi}{\lambda}(n_{eff}(v)-n_0)d$

$$\gamma=\sqrt{\alpha^2+\beta^2} \qquad X=\cos\gamma \qquad Y=\frac{\beta}{\gamma}\sin\gamma \qquad Z=\frac{\alpha}{\gamma}\sin\gamma$$

Given an input polarization state $\begin{pmatrix}\cos\theta\\ \sin\theta e^{i\delta}\end{pmatrix}$ ← pol Ellipse random

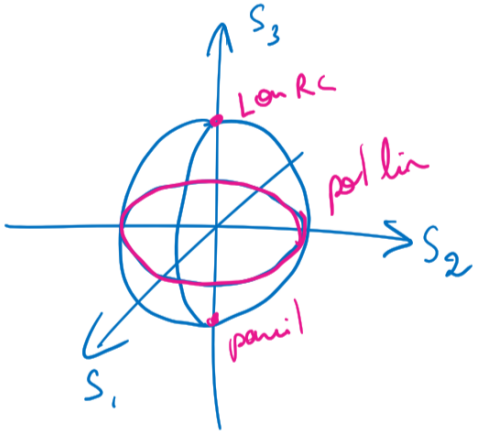
$|\dots|=1$

1) Calculate the output polarization states as a function of β and represent them in the Poincarée Sphere for several input polarization: linear at 0º, linear at 90º, and circular right (fait déjà ellipse)

2) If at the input we have linear polarization at 0º $\begin{pmatrix}1\\0\end{pmatrix}$ and at the output we place a polarizer with the transmission axis along the y axis, evaluate the intensity at the output as a function of β. $\begin{pmatrix}0&0\\0&1\end{pmatrix}$

Dans ⊡ → 1) Jones 2 Meuble
Sphère 2) Dans Ellipse

Si on a



Appliquer wave plate fait monter d'un angle φ → Avec 2 wave plate (2 fast axis ≠) on peut atteindre tous les états de polarisation / not $\hat{S}_1$ et $\hat{S}_2$

1) $\begin{pmatrix} J_{x,out} \\ J_{y,out} \end{pmatrix} = M(\beta) \cdot \underbrace{\begin{pmatrix} J_x \\ J_y \end{pmatrix}}_{\text{Norme 1}}$

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2) $I\,[W/m^2] = \dfrac{|E_{0x}|^2 + |E_{0y}|^2}{2\eta}$

η : Medium impedance vide $\rightarrow \eta = 377\,\Omega$