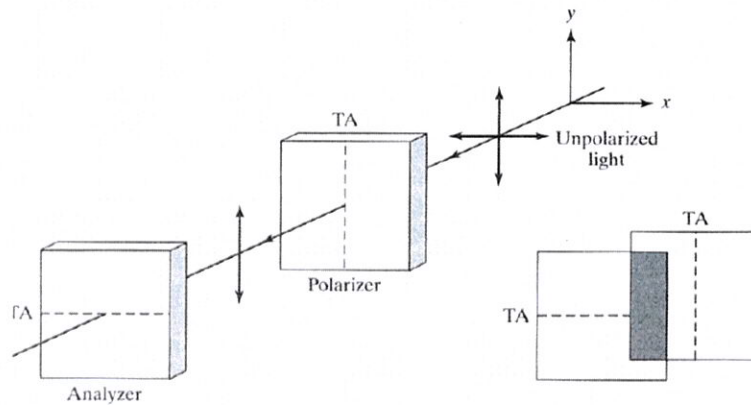


Quiz 9

EC5103

June 7, 2017

- (i) What is the transmitted light intensity if the analyzer (TA) is rotated (offset) by  $\theta$  with respect to the polarizer (TA)? Assume the vertically polarized light's intensity after the polarizer is  $I_0$ .
- (ii) Let's the analyzer is composed of  $N$  identical one with the same offset  $\theta$  from the previous one, where the sum angle of  $N$  stacked analyzers is 90 degrees as shown below. If the output intensity is  $I=0.9I_0$ , what is the number  $N$ ?



Sol) (i)  $I = \cos^2(\theta) I_0$

(ii)  $I = I_0 [\cos^2(\theta)]^N = I_0 [\cos(\theta)]^{2N} = 0.9 I_0$ ,

where  $N\theta = 90^\circ \rightarrow \theta = 90^\circ/N$

$\therefore [\cos(\frac{90^\circ}{N})]^{2N} = 0.9$

For  $N=23$ ,  $[\cos(\frac{90^\circ}{23})]^{46} = 0.8982$   $\leftarrow$

For  $N=24$ ,  $[\cos(\frac{90^\circ}{24})]^{48} = 0.9022$   $\leftarrow$

$N$  is 23 or 24

