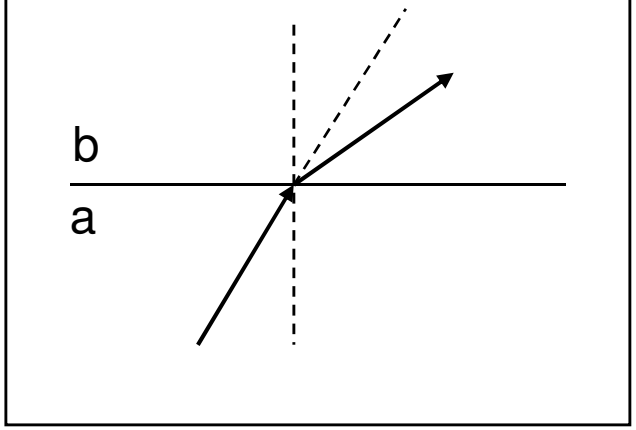
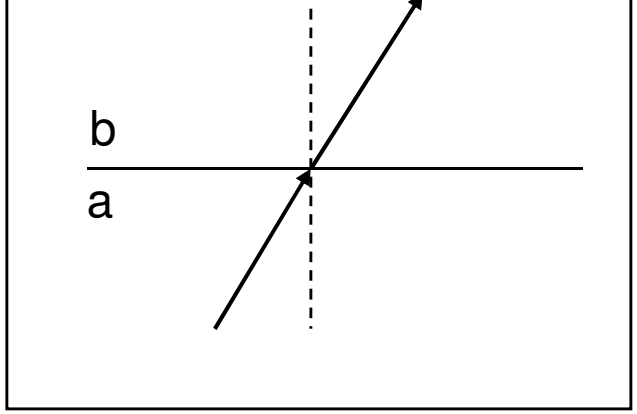
Which rays are drawn correctly?

A

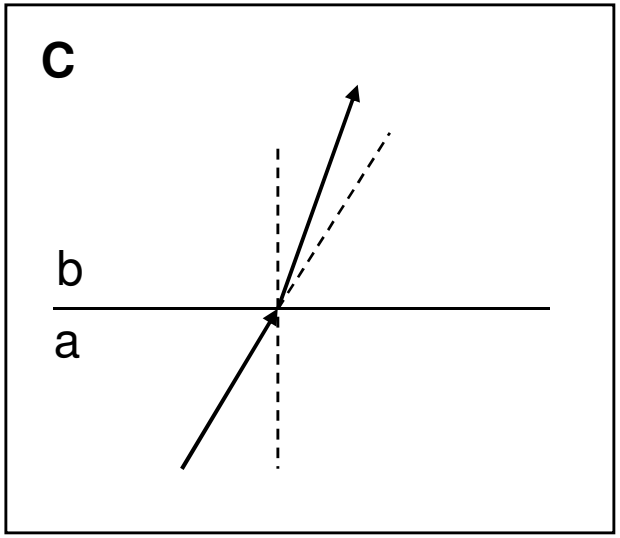


$n_a > n_b$

B



C

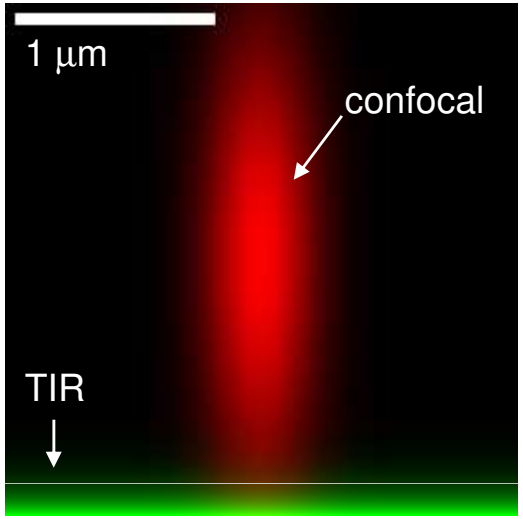


Most light sources emit :

a) un-polarized light

b) polarized light

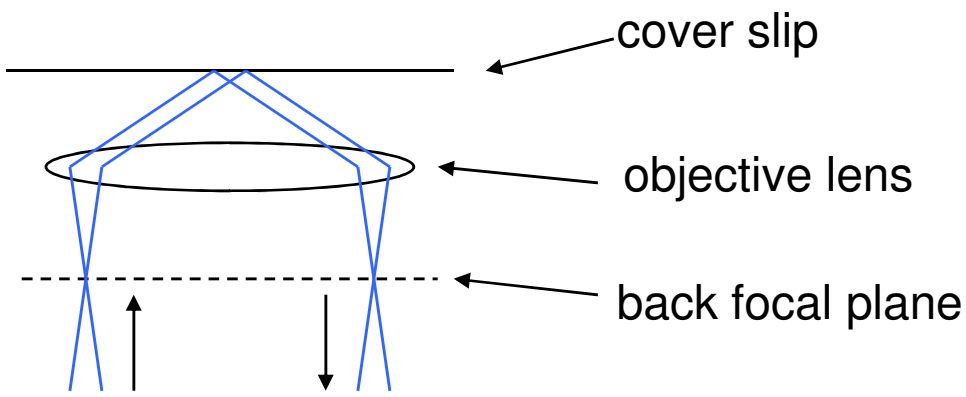
Total Internal Reflection Fluorescence (TIRF) Microscopy



$$I(z) = I(0)e^{-\beta}$$

$$\beta = \frac{\lambda}{4\pi\sqrt{n_1^2 \sin(\alpha)^2 - n_2^2}}$$

λ: wavelength of light
α: incident angle
n_1: index of water (1.33)
n_2: index of cover slip (1.52)



$$NA = n\sin(\alpha) = 1.45$$

β_{min} ~ 70 nm

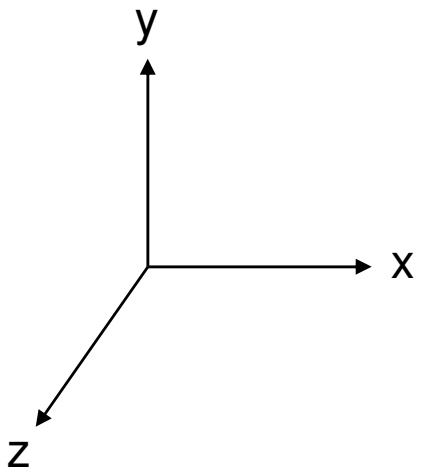
In what direction is the light polarized after the polarizing filter?

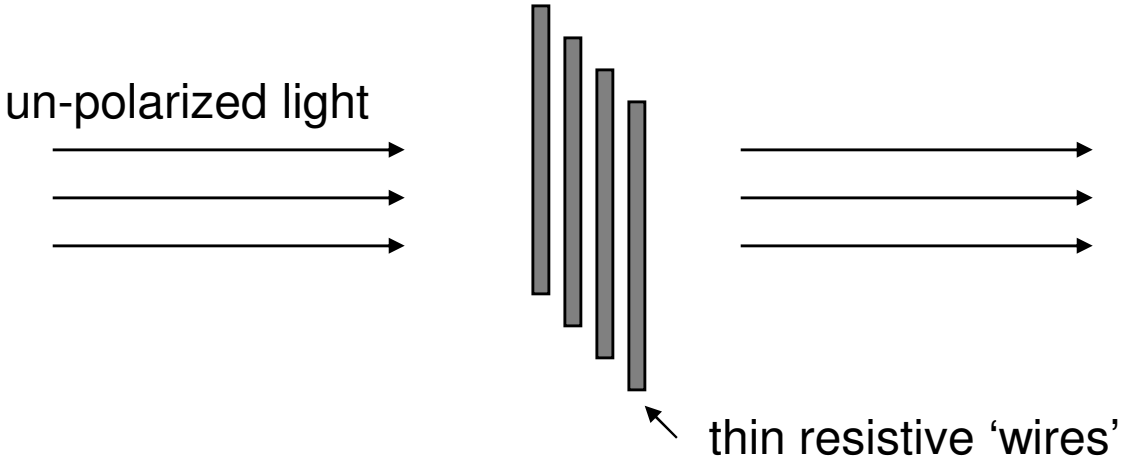
(a) x

(b) y

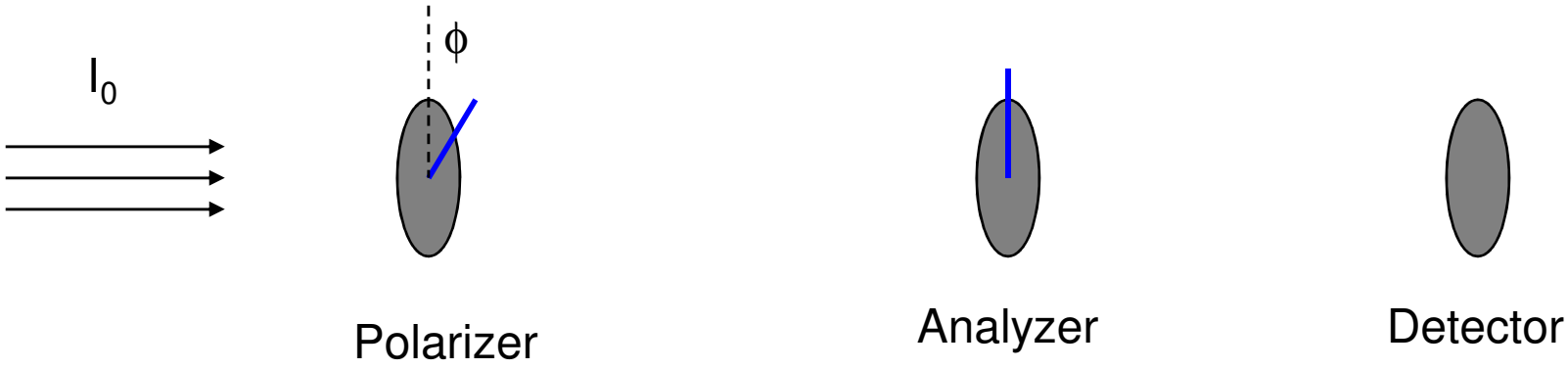
(c) z

(d) still un-polarized





What is the intensity at the detector?



a) I_0

b) $I_0 \cos(\phi)$

c) $I_0 \cos^2(\phi)$

d) $I_0 \cos^2(\phi)/2$

For right circularly polarized light the projection onto the y-axis is given by:

$E_y(x,t)=E_{max}\cos(kx-\omega t)$

what is the projection onto the z-axis?

a) $E_z(x,t)= E_{max}\cos(kx-\omega t)$

b) $E_z(x,t)=-E_{max}\cos(kx-\omega t)$

c) $E_z(x,t)= E_{max}\sin(kx-\omega t)$

d) $E_z(x,t)=-E_{max}\sin(kx-\omega t)$