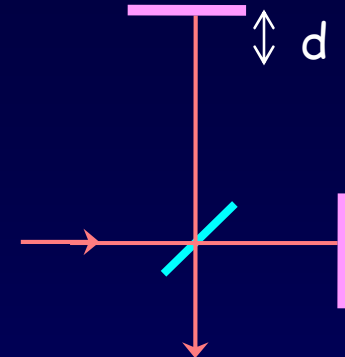


Solution

Consider the following Michelson interferometer. Suppose that for the setup shown, all the light (with $\lambda = 500 \text{ nm}$) comes out the bottom port.



1. How much does the top mirror need to be moved so that none of the light comes out the bottom port?

a. 125 nm

b. 250 nm

c. 500 nm

We need to go from complete constructive to complete destructive interference $\rightarrow \Delta\phi = 180^\circ \rightarrow \delta = \lambda/2$.

However...when we move the mirror by d , we change δ by $2d$.

Therefore, $d = \delta/2 = \lambda/4 = 500/4 = 125 \text{ nm}$.

2. Where does the light then go?

a. down

b. up

c. left

d. right

