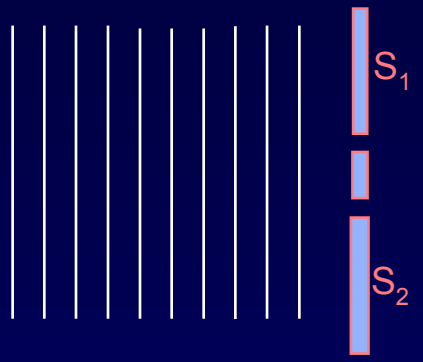
# Solution




We now increase the wavelength by 20 and decrease the slit spacing by 10, i.e., direct a 10.6-μm laser onto two slits separated by 12.5 μm.

How *many* interference peaks may be observed?

(Hint: Does the small angle approximation hold?)

a. 0 b. 1 **c. 3** d. 4 e. ∞

First: Can we use the small angle approximation?

$d = 12.5\ \mu m$; $\lambda = 5.32\ \mu m$ → $d \sim \lambda$ → $\theta$ is *not* small.

$d \sin\theta_m = m\lambda$ Because $\sin\theta_m \leq 1$, $m < d/\lambda = 12.5/10.6 = 1.17$

$\therefore m_{max} = 1$ ( $\theta_1 = 58°$ )

Note: This ALWAYS has a solution for m = 0 → there's *always* a central peak

Note: The pattern is symmetric, so there's a peak corresponding to m = -1 too.