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Physics 2C, Winter 2020

Reading Assignment due Tuesday 2/25: Submit via Gradescope by 11:30am

1. Red laser light is incident on a double-slit and an interference pattern appears on a screen 2 m away.
 - (a) Describe what the interference pattern looks like.
 - (b) What is the path-length difference for the two beams that arrive at the $m = 2$ bright spot?
 - (c) What would happen to the spacing (the distance) between bright spots if we replace the red laser light with blue laser light?
 - (d) What would happen to the spacing (the distance) between bright spots if we move the screen to 4 m away?
 - (e) What would happen to the spacing (the distance) between bright spots if we replace the red laser light with an incandescent light bulb (where tungsten “glows” to provide incoherent light)?
2. In the “NOTE” at the top of page 938 of your textbook, the book warns you that “diffraction gratings” should probably be called “interference gratings.” Why? What makes diffraction (Section 33.3) different from both interference and diffraction gratings?
3. Laser light of wavelength λ goes through a single-slit of width a . When projected on a screen far away, the width of the central bright spot is w .
 - (a) What is the distance from the 1st dark spot to the 2nd dark spot (both dark spots on the same side of the central maximum)?
 - (b) Repeat part (a), but assume that we replace the laser with one that has wavelength $\lambda/2$.

For extra practice (not due): From Chapter 33 of Knight, 4th edition: Conceptual Questions: 2-5, 7. Exercises: 1, 3, 5-8, 10-13, 15, 17, 19.