**Diffraction grating physics**

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Objective: The goal is to verify the nature of the wave of light by measuring its wavelength in a phenomenon of interference, (b) know the gratification of diffraction, and (c) measure the wavelengths of red and purple colors. Equipment: A diffraction grater, a known wavelength laser pointer, an optical bench, a destination support, a orthogonal skewer clamp, a tape measure, a white bulb (40-60 watt) with a support, a ruler, and a calculator Theory: Young's Double-Slit Experiment checks that light is a wave simply because of the bright and dark fringes appearing on a screen. It is the constructive and destructive interference of light waves that cause such fringes. Constructive interference of the waves The following two waves (Fig. 1 ) which have the same wavelength and go to the maximum and at the minimum together are called coherent waves. Consistent waves help each other, add constructively and cause constructive interference. They form a bright fringe. Destructive interference of the waves in Fig. 2 however, the situation is different. When the A1 wave is at its maximum, the A2 wave is at its lowest and work against each other resulting in a wave with A2–A1 amplitude. These two waves completely out of phase interfere destructively. If A2 = A1, they form a dark fringe. The bright and dark fringes in the experiment of the Young follow the following formulas: Bright frange: d sin(θm) = m λ where m = 0.1,2,3 ... Dark frange: d sin(θm) = (m+1/2) λ where m = 0.1,2,3 ... The above formulas are based on the following data: Check the following statement of correctness based on the figure above. The light rays ranging to D2 from S1 and S2 are 3(1⁄2 λ) phase (like 1⁄2 λ out of phase) and thus form a dark fringe. The light beams ranging to B1 from S1 and S2 are 2(1⁄2 λ) of phase (same as being in phase) and therefore form a luminous fringe. Note that SBo is the central line. Passing from a dark or bright fringe to its next fringe changes the distance difference of 1⁄2 λ. Grating diffraction: Diffraction grater is a thin light glass or plastic film that has a large number of lines for (mm) drawn on it. A typical grater with a low line density is (250 lines)/mm. Using more expensive laser techniques, you can create line density of (3000 lines)/mm or higher. When light from a light source and small passes through a grater diffraction, it generates a large number of sources. The very thin space between each two adjacent lines of grater becomes an independent source. These sources are consistent sources that mean they emit into phase waves with the same wavelength. These sources act independently such that each source sends waves in all directions. On a screen a distance (D) away, points can bewhose differences away from these A difference between the interference of many cracks (diffraction retract) and double crack (Young Experiment) is that the first makes major maximums with less intensity in the middle. Â The main maximums (Maxima) occur on both sides of the central maximum at points (or angles) for which a formula similar to that of Youngâ¡s is true. D = distance between the grid and the screen. Â Â Â