**Diffraction & Interference**

**Part 1: Single slit diffraction**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Slit label | Slit width **d**  (mm) | Width of central max **W**  (mm) | Calculated Wave length **λ**  (nm) | **%**  **uncert** | wave length with **absolute uncertainty** (Sig figs must be correct. See how to do below\*)  **λ ± δλ**  (nm) |
| A |  |  |  | +/- 25 |  |
| B |  |  |  | +/- 12.5 |  |
| C |  |  |  | +/- 6.25 |  |
| D |  |  |  | +/- 3.13 |  |

Distance to the screen D = 4000 mm

Wave length λ is given by

**Part 2: Double slit interference**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Slit label | Slit spacing **d**  (mm) | Number of tick marks used  **(n-1)** | **2y (measured distance)**  (mm) | **yaverage**  (mm) | Calculated Wave length **λ**  (nm) | **%**  **uncert** | Calculated Wave length **λ ± δλ**  (nm)  Sig figs must be correct |
| A |  |  |  |  |  | 2 |  |
| B |  |  |  |  |  | 1 |  |
| C |  |  |  |  |  | 2 |  |
| D |  |  |  |  |  | 1 |  |

Distance to the screen D = 4000 mm.

Wave length λ is given by,

\***How to do uncertainty** (i.e., fill in last columns of data tables above). Say you calculated a wavelength of 616.9 nm with an uncertainty of 12.5% or **616.9nm +/- 12.5 %.**

Writing in absolute uncertainty gives you a 616.9 +/- 77,1 nm. Written with correct sig figs we have **620 +/- 80** nm. Note that uncertainty is one sig fig. *It is ok to have two fig figs for uncertainty* ***when the uncertainty starts with a one*** *(e.g., as +/- 144 nm, which would be written as +/- 140 nm)*