

# Interference and Diffraction

**Spoken Tutorial Project**

<https://spoken-tutorial.org>

**National Mission on Education through ICT**

<http://sakshat.ac.in>

**Himanshi Karwanje**

**IIT Bombay**

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# Learning Objectives



# Learning Objectives

- **Verify the relation between wavelength and relative intensity**



# Learning Objectives

- **Verify the relation between wavelength and relative intensity**
- **Find the relation between slit width, maxima and minima**



# Learning Objectives

- Verify the relation between wavelength and relative intensity
- Find the relation between slit width, maxima and minima
- Calculate the angle for the given maxima



# Learning Objectives



# Learning Objectives

- Interpret diffraction intensity profile



# Learning Objectives

- Interpret diffraction intensity profile
- Verify the relation between wavelength and angle



# System Requirements



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- **Ubuntu Linux OS v 16.04**



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- **Ubuntu Linux OS v 16.04**
- **Firefox Web Browser v 62.0.3**



# Pre-requisites



# Pre-requisites

- Learner should be familiar with **Apps on Physics**



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- Learner should be familiar with **Apps on Physics**
- For pre-requisites tutorials please visit this site  
<https://spoken-tutorial.org>



# Apps on Physics



# Apps on Physics

- **Interference of Light at a Double Slit**



# Apps on Physics

- **Interference of Light at a Double Slit**
- **Diffraction of Light by a Single Slit**



# Angle



# Angle

- $\alpha = \text{Sin}^{-1}(k\lambda/d)$



# Angle

- $\alpha = \text{Sin}^{-1}(k\lambda/d)$
- $k = 1$



# Angle

- $\alpha = \text{Sin}^{-1}(k\lambda/d)$
- $k = 1$
- $\lambda = 600 \text{ nm}$  &  $d = 1000 \text{ nm}$



# Angle

- $\alpha = \text{Sin}^{-1}(k\lambda/d)$
- $k = 1$
- $\lambda = 600 \text{ nm}$  &  $d = 1000 \text{ nm}$
- $\alpha = \text{Sin}^{-1}(k\lambda/d)$   
=  $\text{Sin}^{-1}(1 \times 600/1000)$   
=  $\text{Sin}^{-1}(3/5)$   
= 36.86



# Assignment



# Assignment

- **Change the spacing between slits to 3500 nm**



# Assignment

- **Change the spacing between slits to 3500 nm**
- **Calculate the angle of fourth and fifth maxima**



# Tabular Column



# Tabular Column

Wavelength= 600 nm

Width of slit= 3000 nm

Maxima	Relative Intensity	Minima	Relative Intensity
$k=0$	1	$k=0$	0
$k=1$	0.0472	$k=1$	0
$k=2$	0.0165	$k=2$	0
$k=3$	0.0083	$k=3$	0
$k=4$	0.0050	$k=4$	0



# Assignment



# Assignment

- Change the wavelength to 380 nm and width of slit to 5000 nm



# Assignment

- **Change the wavelength to 380 nm and width of slit to 5000 nm**
- **Use the table as shown earlier in this tutorial for your reference**



# Assignment

- **Change the wavelength to 380 nm and width of slit to 5000 nm**
- **Use the table as shown earlier in this tutorial for your reference**
- **Tabulate the total number of maxima and minima**



# Assignment



# Assignment

- For each maxima tabulate the value of relative intensity from the App



# Assignment

- For each maxima tabulate the value of relative intensity from the App
- Explain the diffraction pattern



# Assignment



# Assignment

- Differentiate between interference and diffraction patterns



# Summary



# Summary

- **Verified the relation between wavelength and relative intensity**
- **Found the relation between slit width, maxima and minima**
- **Calculated the angle for the given maxima**



# Summary



# Summary

- **Interpreted diffraction intensity profile**
- **Verified the relation between wavelength and angle**



# Acknowledgement

- These Apps were created by **Walter-fendt** and his team



# About the Spoken Tutorial Project

- Watch the video available at [https://spoken-tutorial.org/What\\_is\\_a\\_Spoken\\_Tutorial](https://spoken-tutorial.org/What_is_a_Spoken_Tutorial)
- It summarises the Spoken Tutorial project



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- It summarises the Spoken Tutorial project
- If you do not have good bandwidth, you can download and watch it



# Spoken Tutorial Workshops

## The Spoken Tutorial Project Team

- Conducts workshops using spoken tutorials
- Gives certificates to those who pass an online test
- For more details, please write to [contact@spoken-tutorial.org](mailto:contact@spoken-tutorial.org)



# Forum for specific questions

- Questions in THIS Spoken Tutorial?
- Visit <https://forums.spoken-tutorial.org>
- Choose the minute and second where you have the question
- Explain your question briefly
- The Spoken Tutorial project will ensure an answer

You will have to register to ask questions



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