1. Due before 9:00 am October 28, 1999

Physics 214 Fall 1999 Problem Set 9

Handout October 19 1999

2. Single slit directions

3. Two slit directions

4. Interference

5. Uncertainty Principle

6. Lcohensence in Lasers

3. Two slit directions

The intensity of the central maximum decreases and the maximum intensity
will be a factor of two smaller. If the central maximum decreases by a factor of two,
the intensity of the central maximum will be a factor of two. If the central maximum
will be a factor of two smaller.

The intensity of the central maximum will not change but the maximum intensity
will be a factor of two smaller. If the central maximum will become weaker,
the intensity of the central maximum will be a factor of two.

The central maximum will be half as wide.

The intensity of the central maximum will be twice as strong, and
the intensity of the central maximum will be twice as strong.

Consider the interference pattern produced by a slit of width a illuminated
by coherent light of wavelength A. Which of the following statements is
true: 1. Reading assignments from Young and Freedman

[4 points]

<table>
<thead>
<tr>
<th>Points</th>
<th>4</th>
</tr>
</thead>
</table>
In physics, we often need to calculate the distance to an object using a given formula. Consider the case of a wave in a medium:

\[ (x - i m) \cos \theta = (m / (2 \pi))^2 \]

where \( x \) is the position of the object, \( m \) is the mass of the wave, \( \theta \) is the angle of incidence, and \( i \) is the imaginary unit. The formula represents the relationship between the position of the object and the wave's properties.

1. **Uncertainty Principle in Waves**

   [6 Points]

The uncertainty principle states that there is a fundamental limit to the precision with which certain pairs of physical properties of a particle, such as position and momentum, can be known. In the context of waves, this principle implies that the more precisely we know the position of a wave, the less precisely we can know its momentum, and vice versa.

### 2. Incoherence in Atomic Spectra

(a) Waves on a String

Suppose we want to create a localized wave on a string using superposition principles. According to the superposition principle, the resultant wave is the sum of the individual waves.

(b) Superposition of Waves

When two waves are superimposed, the resultant wave is the algebraic sum of the individual waves. The phase difference between the waves affects the resulting interference pattern, which can be constructive or destructive depending on the phase difference.

### 3. Interference of Waves

The interference of waves can be observed in various physical phenomena. In a wave interference experiment, two waves are incident on a screen, and the pattern of bright and dark bands is observed. The condition for constructive interference is given by

\[ \phi \int_{0}^{\pi} \cos \theta \, d\theta = 0 \]

This equation represents the condition for constructive interference, where \( \phi \) is the phase difference between the two waves.

### Conclusion

The study of wave interference is crucial in understanding various physical phenomena, including optical phenomena, sound waves, and quantum mechanics. Understanding the principles of wave interference helps in designing experiments and applications in fields such as telecommunications, acoustics, and quantum computing.
don't interfere. Why not suggest that the light coming through, but the reflections
back, but then the light does not happen with window panes. The fact that back
of the field 

interferences of different wavevectors re-

The only thing on where make interference rainbow patterns, because

Marking a laser pulse

for the non-measured widths, we use full widths in this problem.

Whe is the constant C? The constant C depends on our definition of the

there we have a position-wave number uncertainty relation.

Now, let that be some larger and brighter regions of wave numbers, h

\[
\begin{array}{|c|c|}
\hline
x & \lambda \\
\hline
3 & 3 \\
9 & 16 \\
4 & 8 \\
3 & 8 \\
1 & 4 \\
\hline
\end{array}
\]

\[
\frac{t}{f} + \frac{W}{f} + \frac{1}{f} = \frac{f}{f} + \frac{1}{f} = \frac{f}{f}
\]

\[
\left( t \left[ \frac{f}{f} + \frac{W}{f} + \frac{W}{f} \right] \right) = \frac{t}{f}
\]

Lok, that as we use larger and brighter regions of wave numbers.

\[
\left( x \frac{f}{f} + \frac{1}{f} \right) \cos \sum_{x-1}^{x+1} = (x)f
\]

\[
\left( x \frac{f}{f} + \frac{1}{f} \right) \cos \sum_{x-1}^{x+1} = (x)f
\]

In the following table to the left zero of the peaks \( \frac{\lambda}{f} \) defined so the distance from \( x = 0 \)

\[
(\frac{t}{f} + \frac{W}{f} + \frac{1}{f}) \cos \sum_{t-w}^{t+w} = (f \frac{t}{f} + \frac{1}{f}) \cos \sum_{t-w}^{t+w} = (x)f
\]

\[
(\frac{t}{f} + \frac{W}{f} + \frac{1}{f}) \cos \sum_{t-w}^{t+w} = (f \frac{t}{f} + \frac{1}{f}) \cos \sum_{t-w}^{t+w} = (x)f
\]