

# PHYS441: Quantum Physics Tentative Schedule Winter 2009

Jan. 5 7	)	Introduction and review of Math & Modern Physics	Ch. 1, 2.1,2.5,2.6,App.
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12 14	)		
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19 21	)	MLK Day wave mechanics in 1d	Ch. 3
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26 28	)		
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Feb. 2 4	)	QM in Hilbert Space	Ch. 2.2-2.5, 4
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9 11	)	Exam 1 (1 <sup>st</sup> hour): Chap. 1-3	
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16 18	)	Presidents day Angular Momentum	Ch. 6,7,14
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23 25	)		
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Mar. 2 5	)	H atom & EM field	Ch. 8,9
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9 11	)	Exam 2 (1 <sup>st</sup> hour) Grand Finale: Bell Inequality	
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Mar. 18 (Wed.) 7-9 PM Final Exam

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(Fig. 1)

The Puzzle Illustrated by the Double Slit Experiment: (see Feynman Vol. III,1.-3.)

Fig. 1-1. Interference experiment with bullets.

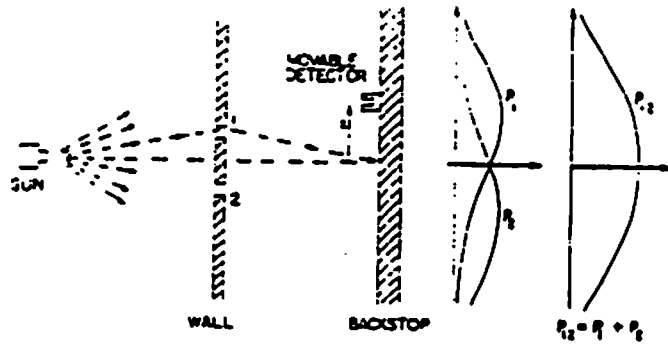


Fig. 1-2. Interference experiment with water waves.

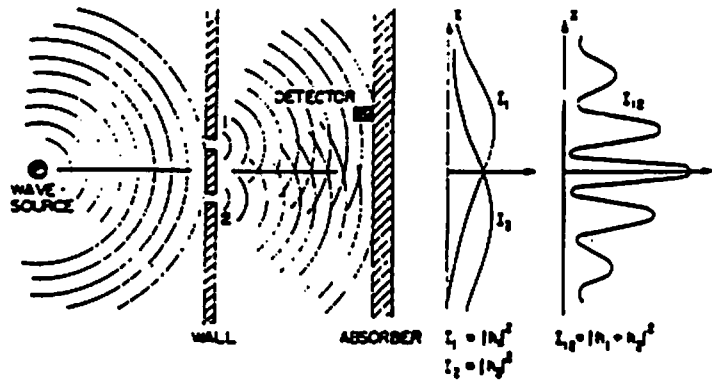


Fig. 1-3. Interference experiment with electrons.

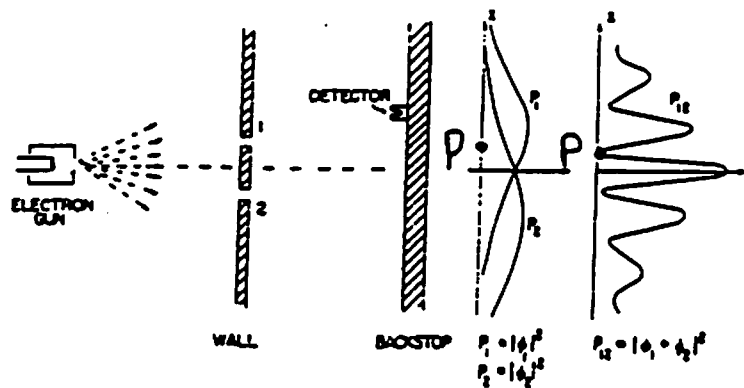


Fig. 2

To fully appreciate the Puzzle, you should try to 'comprehend' that if you open the slit B, electrons will stop arriving at point P ! HW: impress your friends with this, the Central Mystery of Quantum Physics.

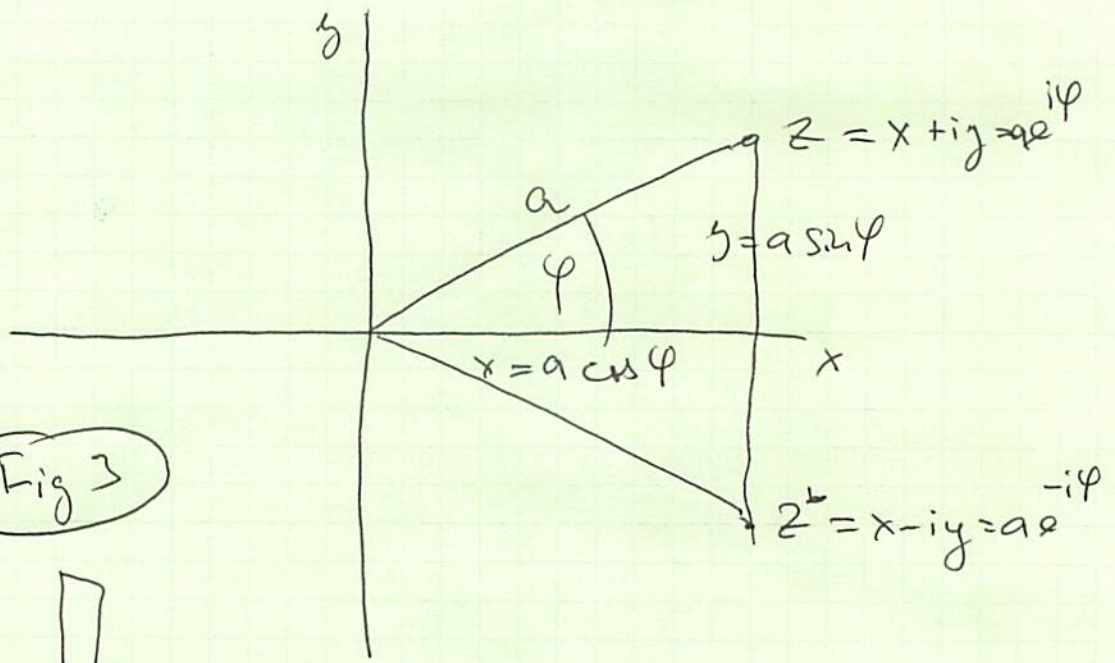


Fig 3

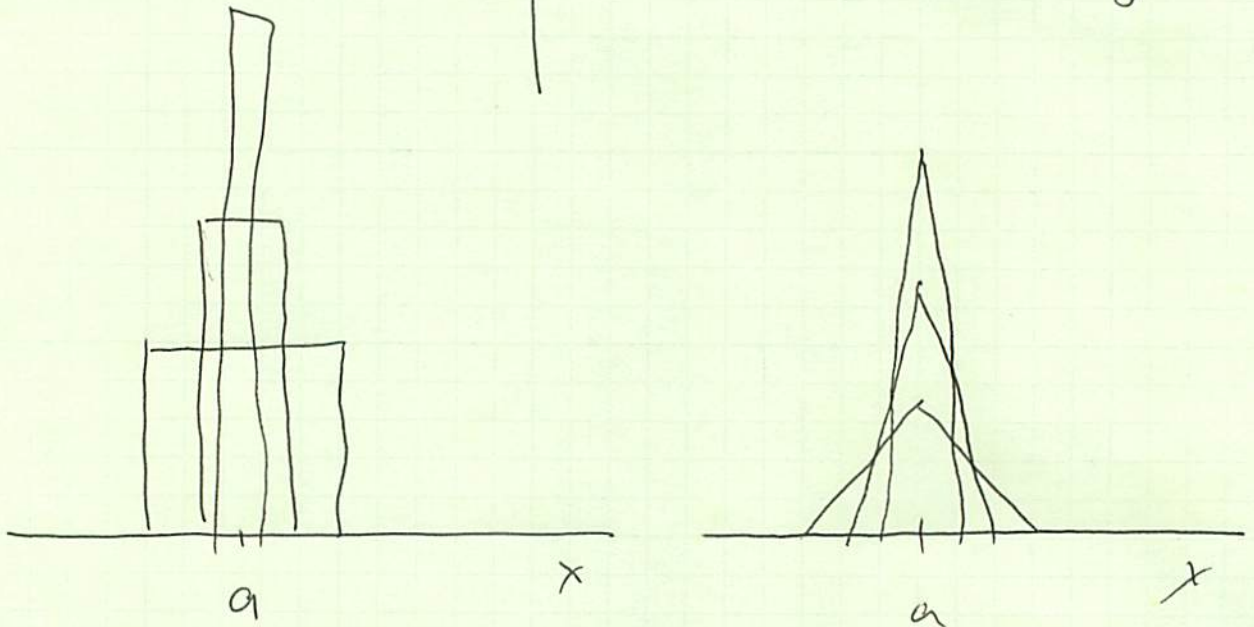


Fig 4  $\delta(x-a)$

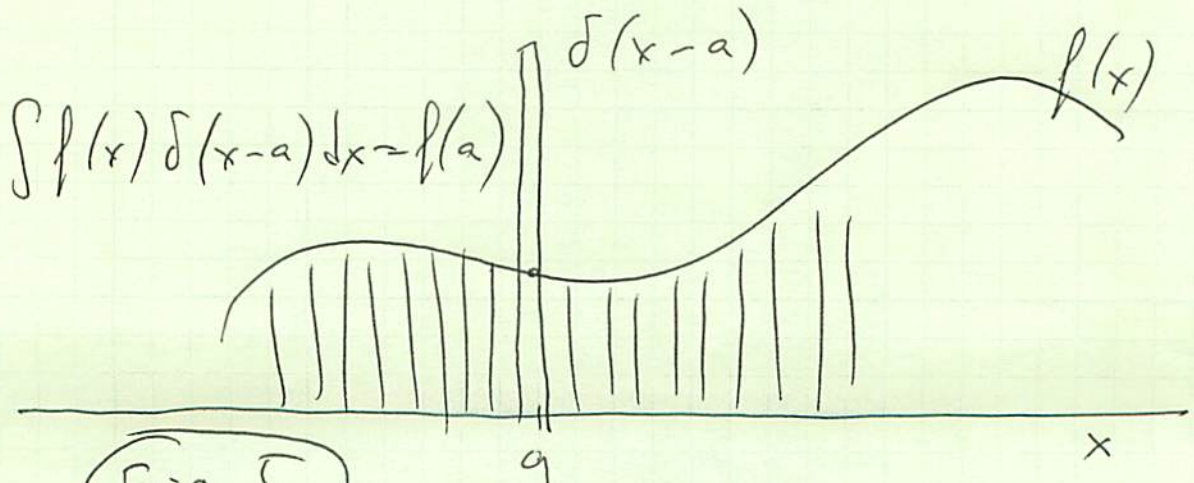
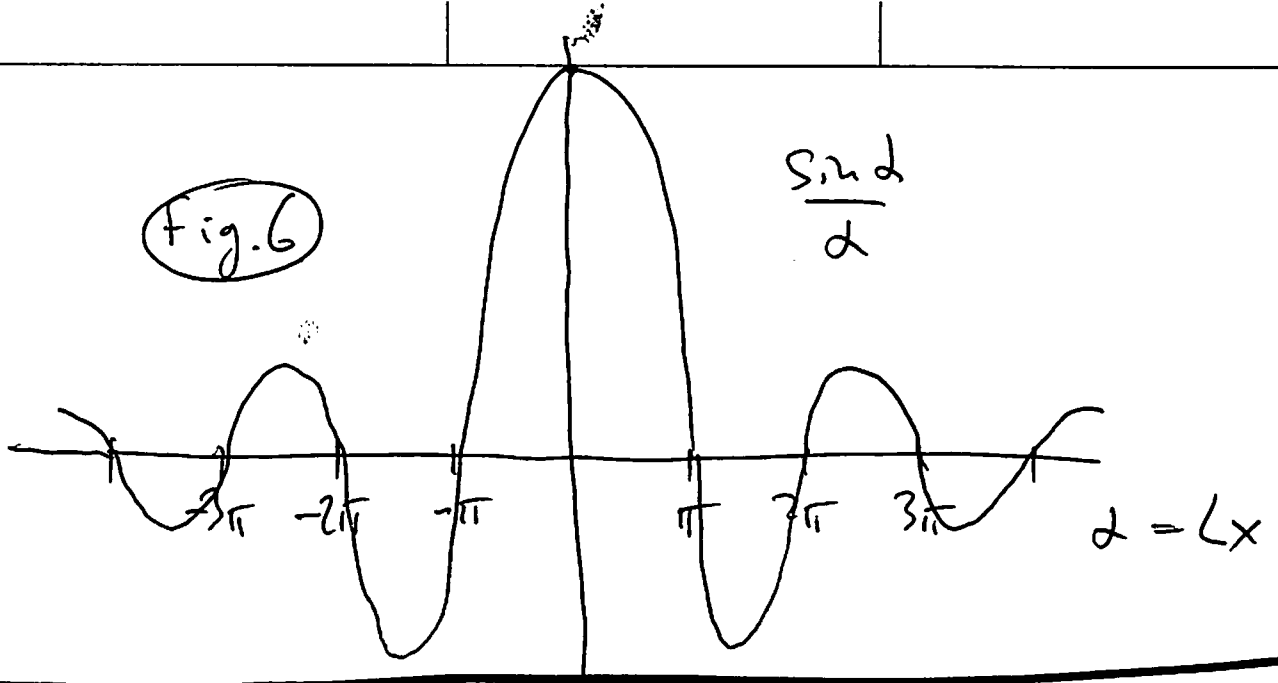


Fig. 5

Fig. 6



$$h = \frac{\delta x}{N} \quad p = \frac{h}{\lambda} \quad \Rightarrow \delta_x \delta_p \geq \frac{h}{10}$$

$$\delta_N \geq \frac{1}{10}$$

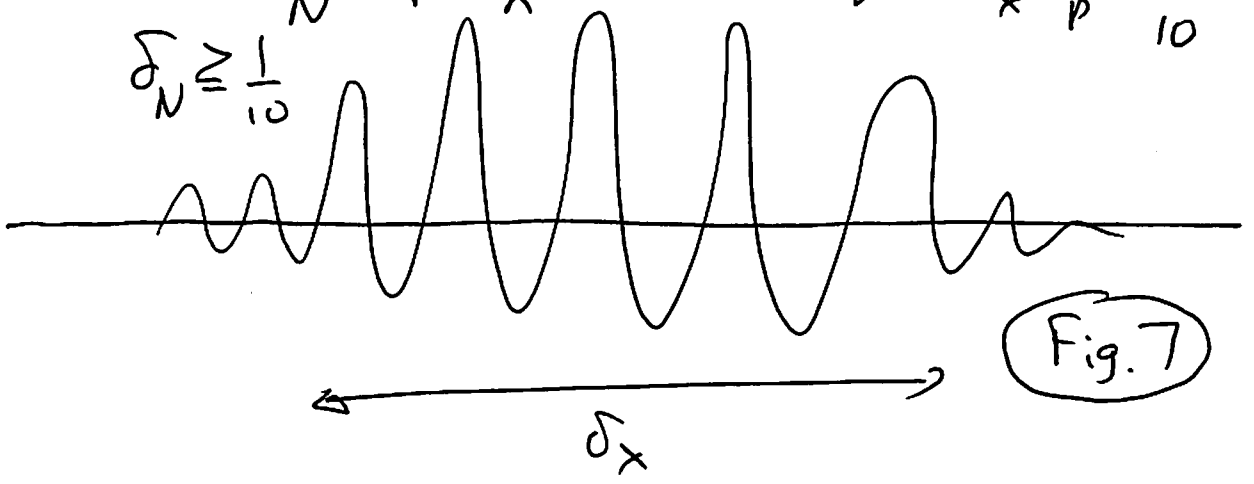
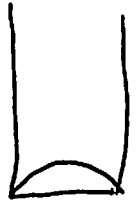
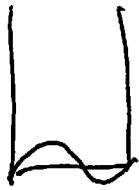


Fig. 7



$$L = \frac{h_1}{2}$$



$$L = 2 \frac{h_2}{2}$$



$$L = 3 \frac{h_3}{3}$$

Fig. 8

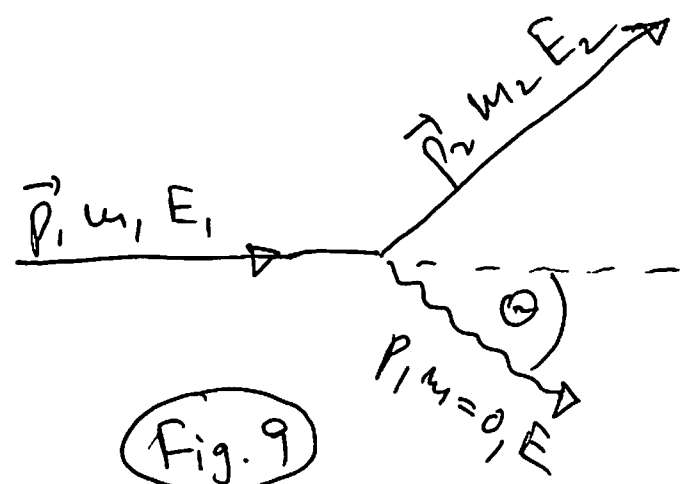


Fig. 9