

中央大學八十九學年度碩士班研究生入學試題

大氣物理研究所 不分組 科目：

近代物理學

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[20%] 1. A spaceship moves with a speed v with respect to a station. A light beam is sent out from this ship at angle θ to the direction of motion of this ship. Find the speed and angle of the light beam observed from the station.

[20%] 2. Explain:

- (a) Compton effect
- (b) Zeeman effect
- (c) Pauli exclusion principle
- (d) Schrödinger equation

3.

[6%] (a) What is uncertainty principle ?

[14%] (b) What is the minimum energy of Hydrogen estimated from this principle?

[20%] 4. Derive the Planck distribution of photon gas, then derive Wien's displacement law.

[20%] 5.

- (a) Show that the phase speed of De Bröglie wave for a moving particle with mass m and velocity v , is greater than c (speed of light).
- (b) Drive the group velocity of De Bröglie wave for a moving particle with velocity v .