

NORTHERN ILLINOIS UNIVERSITY

PHYSICS DEPARTMENT

Physics 283 – Modern Physics

Fall 2024

Problem Set #10

Problem Set Due: Thurs., Dec 5, 2024

Read Krane: Chapter 11

1. OpenStax University Physics Vol. 3: **Section 2.4:** Problem 61
2. OpenStax University Physics Vol. 3: **Section 2.4:** Problem 63
3. OpenStax University Physics Vol. 3: **Section 2.8:** Problem 99
4. OpenStax University Physics Vol. 3: **Section 2.8:** Problem 121

5. In class we calculated the density of states for a 1 and 3-dimensional particle in a box (see Lecture notes (L#3) on the Physics 283 WebPage [www.niu.edu/brown]). Using a similar method, calculate the density of states for a 2-dimensional particle in a box. You should find that the density of states is independent of energy. (I have attached Krane's solution—he gives the density of states per unit area)

6. **Krane: Problem 4** **page 384**
Draw a figure of the bcc structure of CsCl labeled with distances between the atoms

7. **Krane: Problem 17** **page 385** (just show calculation)

8. **Krane: Problem 22** **page 385**
Part (b) which one is obviously the better conductor?

9. **Krane: Problem 23** **page 385**
Part (b) which one is obviously the better conductor?

10. **Krane: Problem 28** **page 385**

11. **Krane: Problem 34** **page 386**

12. **Krane: Problem 36** **page 386**