September 7, 2010

# PHY 741 – Problem Set #6

Finish reading Chapter 2 in **Mahan** and start reading Chapter 3; homework is due Friday, September 10, 2010.

Consider a particle of mass $m$ moving in a one dimensional potential:

$$V(x) = \begin{cases} V_0 & \text{for} \quad x \leq 0 \\ 0 & \text{for} \quad x \geq 0, \end{cases}$$

where $V_0 > 0$.

1. Find the form (for both $x \leq 0$ and $x \geq 0$) of the continuous eigenfunction with eigenenergy $E > V_0$.

2. Calculate the current density $J(x,t)$ and check whether or not it is continuous at $x = 0$.