

NORTHERN ILLINOIS UNIVERSITY

PHYSICS DEPARTMENT

Physics 580 – Solid State Physics

Fall 2020

Problem Set #7

**Kinetic energy of electron gas:**

Show that the kinetic energy of a three-dimensional gas of  $N$  free electrons at  $0^\circ K$  is

$$U_0 = \frac{3}{5} N \varepsilon_F$$

where  $\varepsilon_F$  is the Fermi energy.