SCPY322 Nuclear and Particle Physocs

Second Semester, 2020-21

Problem Set #2

Date: March 5, 2021. Due date: March 12, 2021 (via my mail-box)

1. (20 pt.) Derive an expression of the internal (Coulomb) energy of a uniform charged sphere of radius r and total charge $+Ze$. Compare this with the form of the Coulomb term in the Weizsacker formula.

2. (20 pt.) For a neutron in a three dimensional infinite spherical well of radius $r = 3.6fm$, calculate the actual values of the energies of the $1s, 1p, 1d$, and $2s$ states (in MeV).

3. (20 pt.) Draw the ground state configuration for $^{19}F, ^{33}S, ^{55}Mn$, and ^{91}Zr.