2021 - PHY 981 - Homework set 11 (due Apr 4)

1. **link to lecture notes**
   link to nushellx.zip
   link to toi.zip link to mingw-w64.zip

2. **Read Chapters 24-25.**

3. **For the neutron configuration $(^{d}_{5/2})^n$, what are the allowed (J,T) values for $n = 1, 2, 3, 4, 5, 6$?**

4. **For the configuration $(\pi d_{5/2})(\nu d_{5/2})^2$, what the number of states for each of the allowed (J,T) values? Remember that the states with $T = 3/2$ are the isobaric analoque states of the $(\nu d_{5/2})^3$ configuation.**

5. **For the configuration $(\pi d_{5/2})(\nu d_{5/2})^5$, what the number of states for each of the allowed (J,T) values?**

6. **Calculate the magnetic moment for the 5^+ state in ^{18}F assuming a $(0d_{5/2})^2$ configuration. Use free-nucleon g-factors. Compare to experiment. (I attach a compilation of experimental moments.)**

7. **Calculate the magnetic moment for the 4^+ state in ^{18}O assuming a $(0f_{7/2})^2$ configuration. Use free-nucleon g-factors. Compare to experiment.**

8. **What are the partitions allowed for the $(0d_{5/2}, 0d_{3/2}, 1s_{1/2})$ set of orbitals for ^{19}O. What is the maximum J value allowed?**

9. **Evaluate the spin matrix elements $< S \mid X^q \mid S' >$ for Eqs. 25.25-27.**