This assignment is optional. It will help prepare you, however, for the lectures next week.

**ABSOLUTELY NO LATE WORK ACCEPTED! DUE AT BEGINNING OF CLASS**

In Appendix C of Krane (or wherever) look up the angular momentum \( J \) for the ground state (listed as \( I^\pi \) in Krane; \( \pi = \text{parity} \)) for the following

(1) even Z, even N systems: 
\[ ^4\text{He}, ^8\text{Be}, ^{10,12,14}\text{C}, ^{14,16,18}\text{O}, ^{18,20,22,24}\text{Ne}, ^{22,24,26}\text{Mg}, ^{38,40,42,44,46,48,50}\text{Ca}, ^{90,92,94,96,98,100}\text{Mo}. \]
Do you notice a pattern? Can you find anywhere an even N, even Z isotope that breaks this pattern?

(2) odd Z, odd N: 
\[ ^2\text{H}, ^{12,14,16}\text{N}, ^{18,20}\text{F}, ^{20,22,24,26}\text{Na}, ^{24,26,28}\text{Al}, ^{94,96}\text{Tc}. \]
Do you notice any pattern?

(3) odd A  
Write down both \( J \) (\( I \)) and parity \( \pi \). Also note the Z, N of the following. How do mirror nuclei compare?

\[ ^3\text{He}, ^7\text{Li}, ^7\text{Be}, ^9\text{B}, ^{13}\text{N}, ^{15}\text{N}, ^{15}\text{O}, ^{17}\text{O}, ^{17}\text{F}, ^{19}\text{O}, ^{39}\text{K}, ^{39}\text{Ca}, ^{41}\text{Ca}, ^{41}\text{Sc}, ^{89}\text{Zr}, ^{91}\text{Zr}. \]

worth 30 pts extra credit (added to all other homeworks)