Group Activity 4   **Due:** In class, September 7th
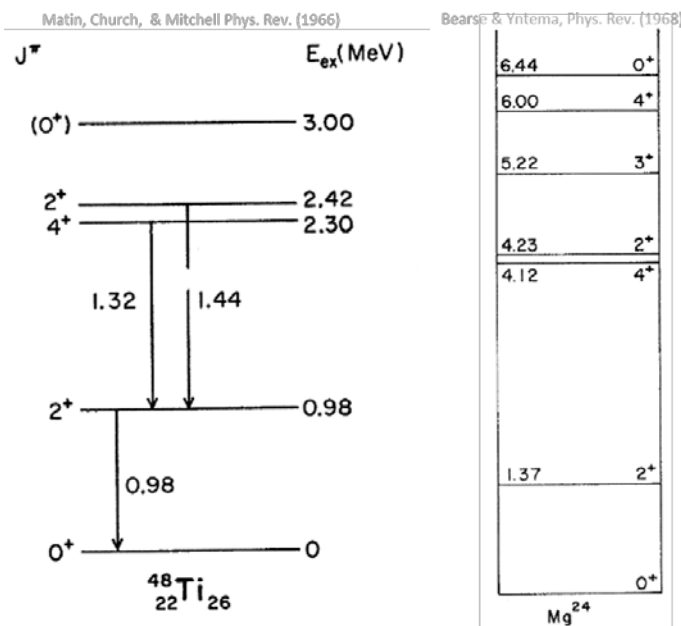
1. In terms of frequencies, $\omega_{rotation} \ll \omega_{vibration}$. Why?

2. ^{32}Mg has a deformation $\beta = 0.51$. What are the expected excitation energies for the 2+, 4+, and 6+ excited states, assuming it is a spheroidal rotor?
   Compare to the values from H. Crawford et al. Phys. Rev. C 2016.

3. Which of these nuclides is spherical and which is deformed? How can you tell?

4. Compare the non-deformed and deformed shell-model predictions for the ground-state J^π for ^{19}F, ^{19}Ne, ^{21}Ne, and ^{23}Na ($\beta \approx 0.1$) to the experimentally determined values.