

1. Is the strong force effected by nucleon charge? No
 1.1. Mirror nuclei are used to examine the strong force. Select the mirror nuclei pairs below.

Strong force not effected by charge.
 All nucleon interactions are the same.

- ^3H and ^3He ^{20}F and ^{20}N ^{23}Na and ^{23}Ne ^{35}S and ^{35}K ^{51}V and ^{51}Cr

Mirror nuclei are isobars with
 p in one isotope equal to n in
 another isotope.

2. Using the shell model and the chart of the nuclides provide the spin and parity of the following isotopes.

Isotope	Spin and Parity from shell model	Spin and Parity from Chart of the Nuclides
^{21}F	<u>$5/2+$</u> 9th proton 1d $5/2$	<u>$5/2+$</u>
^{50}V	<u>$0+$ or $7+$</u> 23rd proton 27th neutron	<u>$6+$</u>
^{99}Tc	<u>$9/2+$</u> 43rd proton 1g $9/2$	<u>$9/2+$</u>
^{135}Xe	<u>$11/2-$</u> 81st neutron 1h $11/2$	<u>$3/2+$</u>
^{137}Xe	<u>$9/2-$</u> 83rd neutron 1h $9/2$	<u>$7/2-$</u>
^{232}Th	<u>$0+$</u> even-even	<u>$0+$</u>
^{235}U	<u>$11/2+$</u> 143th neutron 1i $11/2$	<u>$7/2-$</u>
^{238}U	<u>$0+$</u> even-even	<u>$0+$</u>
^{238}Pu	<u>$0+$</u> even-even	<u>$0+$</u>
^{239}Pu	<u>$11/2+$</u> 145th neutron 1i $11/2$	<u>$1/2+$</u>

- 2.1. Compare your results with the actual data. Which isotope or isotopes are non-spherical based on the results? where shell model calculation does not agree with actual value

- ^{21}F ^{50}V ^{99}Tc ^{135}Xe ^{137}Xe ^{232}Th ^{235}U ^{238}U ^{238}Pu ^{239}Pu