

PROPERTIES OF SAMARIUM (A=145,147,149) ODD ISOTOPES NUCLEI

F.R. Akhmedzhanov

(Samarkand state university, Uzbekistan)

Values of spins of main states ($I=7/2$) in accordance with the cover model can be interpreted as states of odd neutron $2f_{7/2}$. An analysis of main and low located excited levels of samarium odd-neutron nuclei with $N=83,85$ and 87 shows that the levels $3/2^-$ of $N=83$ nuclei are located higher than those for $N=85$ nuclei. Analogous behavior is observed for states $5/2^-$ while transition from $N=85$ nuclei to $N=87$ ones.

^{145}Sm nucleus has one neutron over filled $N=82$ cover. The energy of first excited state has high value (893,74 keV, $3/2^-$). Calculations using single-particle model well describe characteristics of the following states: 0 keV ($2f_{7/2}$), 893,74 keV ($3p_{1/2}$) and 1423,22 keV ($1h_{9/2}$) in ^{145}Sm .

^{147}Sm nucleus has three neutrons over a closed cover. The energy of first excited state 121,25 keV ($5/2^-$) is abruptly decreased.

^{149}Sm nucleus has five neutrons over filled $N=82$ cover. First excited level of ^{149}Sm ($5/2^-$) is analogous to corresponding level of ^{147}Sm ($5/2^-$). The following levels 277,08 keV ($5/2^-$) and 350,00 keV ($3/2^-$) of the ^{149}Sm , probably, have multi-particle configuration. Values of $\lg ft$ of corresponding β^- -transitions to these levels (8,4 and 8,2) allow one to make a conclusion that their wave-functions contain admixtures of a state which is described by $1h_{9/2}$ orbit, β^- -transition to the last is forbidden in accordance with l quantum number.

Even-even spanning set of ^{149}Sm is a nuclid of ^{148}Sm , which is soft for surface vibrations. That's why level 528,48 keV ($3/2^-$), probably, in accordance with quasiparticle-phonon model has the admixture of quasiparticle components in sub-covers $f_{7/2}$, $f_{5/2}$ (these levels are energetically close) plus phonon $Q_1(2)$.

It is difficult to tell anything concrete about property of 558,41 keV ($5/2^-$) level. Values of $\lg ft$ for β^- -transition to this state point out to either multiparticle configuration with strong component of $h_{9/2}$ orbit, or appearance of noticeable deformation.

As a whole, the model rather well describes the structure of levels for these nuclei.