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Properties of States in the g9/2 Shell that are Eigenstates of all Interactions LARRY ZAMICK, Rutgers University, PIETER VAN ISACKER — In the $(g9/2)^4$ configuration there are special states with angular momenta I=4 and I=6 which have seniority v=4 and which are eigenstates of all interactions, seniority conserving or not. The energy of, say, the I=4 special state can be expressed as Sum X(J) E(J) where E(J) are the 2 particle matrix elements. The quantity X(J) can be interpreted as the number of pairs with angular momentum J in the I=4 v=4 special state. A striking property is that X(4) is one. We attempt to prove this and find that in order for this to be true a coefficient of fractional parentage $[(j^4)$I=4 v=4—$)(j^5)$j v=5] has to vanish. It does indeed vanish but a proof of why is lacking. (A similar story holds for I=6). There are strong E2 transition matrix elements between the I=6 v=4 and I=4 v=4 special states. For states of the $(f7/2)^4$ configuration with I=2 v=4 X(2) is also equal to one and this can be proved (likewise X(4)=1 for I=4 v=4). The energy of these states can be derived i.e. all the X(J) can be determined from solvable interactions and the condition that X(I)=1 for the v=4 states.

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