

Abstract Submitted  
for the DNP07 Meeting of  
The American Physical Society

**Partial Dynamical Symmetries** LARRY ZAMICK, Rutgers University

— Two examples of partial dynamical symmetries are presented. 1) The  $j=9/2$  shell of identical particles e.g. neutrons affords the first shell where one can have seniority mixing via a two-body interaction. It was however noted by Escuderos and Zamick that even with a seniority violating interaction certain states remain pure. For 4 neutrons in the  $9/2$  shell for total ang. momentum  $I=4$  there is one pure seniority  $v=4$  state. This does not mix with the single seniority  $V=2$  state or with the other  $v=4$  state. A proof is presented showing that this special state does not mix with  $V=2$ . A similar scenario plays out for  $I=6$ . 2) In  $44\text{Ti}$  if we sent the two-body  $T=0$  matrix elements to zero, keeping only  $T=1$ , then in the single  $j$  shell model we get degeneracies of certain states e.g. a  $3+, 7+, 9+$ , and  $10+$  state are all degenerate. The “symmetry” is partial because we do not get degeneracies for  $I=0, 2, 4, 6, 8$ . The explanation is that the symmetry only occurs if in  $44\text{T}$  (2 protons and 2 neutrons) the total angular momenta are ones that cannot occur for 4 identical particles i.e.  $44\text{Ca}$ . Where the partial dynamical symmetry applies  $J_p$  and  $J_n$  are good “dual” quantum numbers for all the  $T=0$  states.

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Date submitted: 09 Jul 2007

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