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The number of $J = 0$ pairs in ^{44,46,48}Ti LARRY ZAMICK, ALBERTO ESCUDEROS, ARAM MEKJIAN, Rutgers U. — In the single j-shell, the configuration of an even–even Ti isotope consists of 2 protons and n neutrons. The $I = 0$ wave function can be written as

$$\Psi = \sum_{Jv} D(J, Jv)[(j^2)^J_\pi (j^n)^J_\nu]^{I=0},$$

where v is the seniority quantum number. There are several states with isospin $T_{\rm min} = |(N - Z)/2|$, but only one with $T_{\rm max} = T_{\rm min} + 2$. By demanding that the $T_{\rm max}$ wave function be orthogonal to the $T_{\rm min}$ ones, we obtain the following relation involving a one-particle cfp:

$$D(00) = \frac{n}{2j+1} \sum_J D(J, Jv)(j^{n-1}(jv = 1)j|j^n J)\sqrt{2J+1}$$

This leads to the following simple expressions for the number of $J = 0$ np pairs in these Ti isotopes:

- For $T = T_{\rm min}$, # of pairs $(J_{12} = 0) = 2|D(00)|^2/n$
- For $T = T_{\rm max}$, # of pairs $(J_{12} = 0) = 2n|D(00)|^2 = \frac{2n(2j+1-n)}{(2j+1)(n+1)}$

For ^{44}Ti we have also the result for *even* J_{12}

$$\#\text{ of } nn \text{ pairs } = \#\text{ of } pp \text{ pairs } = \#\text{ of } np \text{ pairs } = |D(J_{12}, J_{12})|^2$$

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