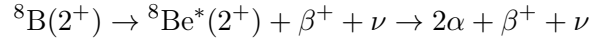


Formulas for ξ and Θ

Definitions

J is the spin of the initial nucleus. J' is the spin of the β -decay daughter nucleus. J'' is the spin of the final nucleus. L is the angular momentum of the α particle with respect to the final nucleus.

As an example, consider the β -delayed α decay of ${}^8\text{B}$:



Obviously, $J = J' = 2^+$. The final nucleus is an α particle so $J'' = 0^+$. Finally, in order to conserve angular momentum in the ${}^8\text{Be}^* \rightarrow 2\alpha$ decay we must have $L = 2$.

Formulas

The formulas for the two coefficients, ξ and Θ , that enter the expression for the β - ν - α triple-correlation amplitude (eq. (5) of ref. [1]) are:

$$\begin{aligned} \xi = 10 & \left[\frac{L(L+1)(2L+1)}{(2L-1)(2L+3)} \right]^{1/2} \\ & \times \left[\frac{(2J'-1)(2J'+1)(2J'+3)}{J'(J'+1)} \right]^{1/2} \\ & \times W(2J' L J''; J' L), \end{aligned}$$

where $W(j_1 j_2 J j_3; J_{12} J_{23})$ is Racah's W -coefficient (if necessary, consult Wikipedia), and:

$$\Theta = (-)^{J'-J} \left[\frac{30J'(J'+1)(2J'+1)}{(2J'-1)(2J'+3)} \right]^{1/2} \times W(J' 1 J 1; J 2)$$

. In the special cases where $J' = J$ or $J' = J \pm 1$, the coefficient Θ is given by:

$$\Theta = \begin{cases} -(J'+1)/(2J'-1) & , J' = J+1 \\ 1 & , J' = J \\ -J'/(2J'+3) & , J' = J-1 \end{cases}.$$

Useful references

- [1] E. T. H. Clifford *et al.*, Nucl. Phys. A **493**, 293 (1989).
- [2] B. R. Holstein, Rev. Mod. Phys. **46**, 789 (1974).