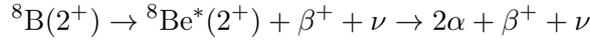


## Formulas for $\xi$ and $\Theta$

### Definitions

$J$  is the spin of the initial nucleus.  $J'$  is the spin of the  $\beta$ -decay daughter nucleus.  $J''$  is the spin of the final nucleus.  $L$  is the angular momentum of the  $\alpha$  particle with respect to the final nucleus.

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



Obviously,  $J = J' = 2^+$ . The final nucleus is an  $\alpha$  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,  $\xi$  and  $\Theta$ , that enter the expression for the  $\beta$ - $\nu$ - $\alpha$  triple-correlation amplitude (eq. (5) of ref. [1]) are:

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

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  $\Theta$  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).