

${}^{12}\text{C}({}^3\text{He}, {}^6\text{He})$  1974Be66, 1991Go13

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	J. H. Kelley, B. Grees	ENSDF	31-July-2020

- 1964Ce04:** A 65 MeV beam of  ${}^3\text{He}$  ions from the Berkeley 88-inch cyclotron was used to study the  ${}^9\text{Li}$  and  ${}^9\text{Li}$  nuclei via  ${}^{12}\text{C}({}^3\text{He}, {}^6\text{He}/{}^6\text{Li})$  reactions. A  $\Delta E$ -E telescope was rotated in a 36 inch scattering chamber to cover  $\theta=15.8^\circ-33.9^\circ$ .  ${}^9\text{C}_{\text{g.s.}}$  was observed with the mass excess  $\Delta M=28.95$  MeV 15. the IMME was analyzed for the mass 9  $T=3/2$  quartet  ${}^9\text{Li}$ ,  ${}^9\text{Be}$ ,  ${}^9\text{B}$  and  ${}^9\text{C}$ . This experiment was credited with the first observation of  ${}^9\text{C}$  (2012Th01); however see (1956Sw77).
- 1970Tr05:** Studied  ${}^{12}\text{C}({}^3\text{He}, {}^6\text{He})$  at  $E=68-70$  MeV using the Enge split pole spectrograph at MSU. Measured  $\sigma(E({}^6\text{He}), \theta=10.68^\circ)$  and deduced  $Q=-31.578$  MeV 8. Using this  $Q(\beta^-)$  value,  $\Delta M({}^9\text{C})=28.911$  MeV 9 was deduced; the value was compared with  $\Delta M=28.904$  MeV 4 from a conference proceedings (1967Ba59). The authors also analyzed the IMME for the  $A=9$   $T_Z=3/2$  nuclei.
- 1971Tr03:** A more complete description of the (1970Tr05) analysis is given in (1971Tr03). The discussion includes details on the calibration reactions, and results from  $\theta=10.68^\circ$  to  $14.82^\circ$ . The discussion includes more details on the IMME and comparison with other analyses.
- 1974Be66:** Studied the first excited state of  ${}^9\text{C}$  using the  ${}^{12}\text{C}({}^3\text{He}, {}^6\text{He})$  reaction at  $E=74$  MeV. In this study, the second  $T_Z=3/2$  states of  ${}^9\text{C}$  and  ${}^9\text{B}$  ( ${}^{11}\text{B}(p, t)$ ) were populated and analyzed using the MSU Enge spectrograph; results are presented for  $\theta=8^\circ$ . For the new state  $\Delta M=31131$  keV 11,  $E_x=2219$  keV 10 and  $\Gamma_{\text{c.m.}}=100$  keV 20 are deduced. The IMME is discussed for the second  $T_Z=3/2$  levels of  $A=9$  nuclei.
- 1991Go13, 1991GoZR:** Studied  ${}^{12}\text{C}({}^3\text{He}, {}^6\text{He})$  at  $E=76.7$  MeV, measured  $\sigma(E({}^6\text{He}))$  and observed known levels at  ${}^9\text{C}(0, 2.2$  MeV). In addition, they reported a new level at  $E_x=3.30$  MeV 5 and evidence for a broad level at  $E_x=4.3$  MeV. Subsequent experiments have not observed a level consistent with  $E_x=3.30$  MeV 5. However, in their figure 1, lines have been drawn to connect data points as a guide to the eye. Scanning the figure to obtain the data points and viewing the spectrum without the *guides for the eyes* supports the observation of an excess of counts in this region; it is possible that a more sophisticated approach to fitting the data would yield consistency with the  $E_x=3.6$  MeV level reported in later measurements.

 ${}^9\text{C}$  Levels

E(level)	$J\pi^\#$	$\Gamma$
0	$3/2^-$	
2218 <sup>†</sup> 11	$5/2^-$	100 <sup>†</sup> keV 20
$3.30 \times 10^3$ ? <sup>‡</sup> 5		
$\approx 4.3 \times 10^3$ ? <sup>‡</sup>		

<sup>†</sup> From (1974Be66).

<sup>‡</sup> From (1991Go13).

<sup>#</sup> From comparison with the  ${}^9\text{Li}$  mirror (1974Be66).