
**Cross Reference (XREF) Flags**

<table>
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<tr>
<th>E(level)</th>
<th>J$^\pi$</th>
<th>Γ</th>
<th>XREF</th>
<th>Comments</th>
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</thead>
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<tr>
<td>0</td>
<td>0$^+$</td>
<td>130 keV</td>
<td>50</td>
<td>%2p=100</td>
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</table>

$^{8}\text{C}$ Levels

- **A**: $^9\text{Be}(^{9}\text{C},^{8}\text{C})$
- **B**: $^{12}\text{C}(^{3}\text{He},^{9}\text{Li})$
- **C**: $^{14}\text{N}(^{3}\text{He},^{9}\text{Li})$

2010Ch42: The authors measured the multiproton decay properties of \(^8\text{C}\) by measuring the complete kinematics of remnant \(\alpha+4p\) decay products. The proton correlations indicate that the decay follows a \(^8\text{C}\rightarrow^6\text{Be}+2p\rightarrow\alpha+2p+2p\) multi-step path. A beam of 70 MeV/nucleon \(^9\text{Be}\) was produced by fragmentation of a \(^{16}\text{O}\) beam at the NSCL. The \(^9\text{Be}\) beam impinged on a \(^9\text{Be}\) target and short lived unbound nuclei produced in the reactions were studied by reconstruction of the breakup particle kinematics. The proton-proton pairing correlations indicate that 92\% of events proceed through the \(2p+^6\text{Be}_{\text{g.s.}}\) decay channel. Combined with results on \(^6\text{Be}\), this indicates a \(^8\text{C}→^6\text{Be}+2p→\alpha+2p+2p\) decay path. Data on \(^8\text{B}^*\) decay is consistent with 2p decay from \(^8\text{B}^*(10.61\text{MeV})\) which is the IAS of \(^8\text{C}_{\text{g.s.}}\).

2011Ch32: The authors impinged a 70 MeV/nucleon \(^9\text{Be}\) beam on a thick \(^9\text{Be}\) target and detected ejected reaction products with a large area position sensitive \(\Delta E-E\) array. Reconstruction of the complete kinematics permitted an analysis of excitation energies, decay pathways and associated branching ratios for several nuclei. A beam of 150 MeV/nucleon \(^{16}\text{O}\) ions was fragmented in a thick \(^9\text{Be}\) target to produce a 70 MeV/nucleon \(^9\text{Be}\) beam in the NSCL A 1900 fragment separator. The \(^9\text{Be}\) beam impinged on a 1mm thick \(^9\text{Be}\) target and reaction products were detected in 14 position sensitive \(\Delta E-E\) elements of the HiRA array. The coincident reaction products were analyzed via kinematic energy reconstruction to evaluate excitation energies and decay paths. The authors obtained the \(^8\text{C}\) mass excess \(\Delta M(8\text{C})=35.030\text{ MeV}\) and the width \(\Gamma=130\text{ keV}\).

### \(^8\text{C}\) Levels

<table>
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<th>(\Gamma)</th>
<th>Comments</th>
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<tbody>
<tr>
<td>0</td>
<td>130 keV 50</td>
<td>Obtained mass excess 35.030 MeV.</td>
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12C(α,8He) **1974Ro17,1976Tr01**

1974Ro17: E=156 MeV, measured Q of 8He spectrum, σ, deduced 8C mass excess and width. This is the article in which 8C is first recognized (2012Th01). The differential cross section was found to be about 20 nb/sr at θ_{lab}=2°. The mass excess of 8C was found to be ∆M(8C)=35.30 MeV 20. As indicated above, 8C decays by proton emission. Assuming a Gaussian line shape, the width of observed 8C state is found to be Γ=0.22 MeV +8−14.

Since the 8He spectrum is the observed quantity in this experiment, a change in the measured mass of 8He would lead to a change in the mass of 8C. In (1974Ce05) a more accurate value of the mass defect of 8He led to a revision of the measured mass defect of 8C, ∆M(8C)=35.38 MeV 17.

1976Tr01: E=123.5 MeV, measured σ, deduced mass excess and width. The mass excess of 8C was found to be ∆M(8C)=35.10 MeV 3. The width was found to be Γ=230 keV 50 assuming a Gaussian fit and 183 keV 56 assuming a Breit-Wigner fit. An IMME study of A=8 nuclei is reported in this article.

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<td>0</td>
<td>230 keV 50</td>
<td>Γ: from (1976Tr01), other value Γ=0.22 MeV +8−14 (1974Ro17).</td>
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</table>
$^{14}$N($^{3}$He,$^{9}$Li) 1976Ro04

1976Ro04: The $^{3}$He beam with energy $E=76$ MeV from the MSU cyclotron collided with a target of either a solid melamine ($C_3N_6H_6$) or $N_2$ gas and the $^{9}$Li spectrum was observed. Measured laboratory cross sections with approximately 40\% uncertainties are $d\sigma/d\omega=3$ nb/sr and 5 nb/sr at $\theta_{lab}=8^\circ$ and 10$^\circ$. The authors determined that the mass excess of $^{8}$C to be $\Delta M(^{8}\text{C})=35.06$ MeV. Assuming a Gaussian shape for the line shape, the width was found to be $\Gamma=290$ keV.

$^{8}$C Levels

<table>
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<tr>
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<th>$\Gamma$</th>
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REFERENCES FOR A=8


Discovery of isotopes with Z ≤ 10.
<table>
<thead>
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<th>Year</th>
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<tbody>
<tr>
<td>2013</td>
<td>Y.H. Lam, B. Blank, N.A. Smirnova, J.B. Bueb, M.S. Antony - At.Data Nucl.Data Tables 99, 680 (2013). \textit{The isobaric multiplet mass equation for }A \leq 71\textit{ revisited.}</td>
</tr>
<tr>
<td>2017</td>
<td>M. Wang, G. Audi, F.G. Kondev, W.J. Huang et al. - Chin.Phys.C 41, 030003 (2017). \textit{The AME2016 atomic mass evaluation (II). Tables, graphs and references.}</td>
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