

$^{12}\text{C}(^{12}\text{Be}, ^{12}\text{Be}')$ 1999Fr04,2001Fr02,2015Ya05

Type	Author	History	Citation	Literature Cutoff Date
Full Evaluation	J. H. Kelley, J. E. Purcell and C. G. Sheu		NP A968, 71 (2017)	1-Jan-2017

- 1994Za02: $^{12}\text{C}(^{12}\text{Be}, ^{12}\text{Be}')$ E=796 MeV, measured quasi-elastic $\sigma(\theta)$.
1999Fr04,2000FrZZ: $^{12}\text{C}(^{12}\text{Be}, 2^6\text{He}), (^{12}\text{Be}, \alpha^8\text{He})$, E=378 MeV, measured Q-value spectra. Deduced projectile breakup mechanism features. ^{12}Be deduced deformed exotic cluster structure.
1999Or07: $^{12}\text{C}(^{12}\text{Be}, \text{X})$ E=31.5 MeV/nucleon, measured He fragment energies, excitation energy spectrum, $\sigma(\theta)$ for breakup in $^6\text{He}+^6\text{He}$ and $^4\text{He}+^8\text{He}$ channels. ^{12}Be deduced resonance energy, range of angular momentum, moment of inertia, possible configuration.
2000Iw03: $^{12}\text{C}(^{12}\text{Be}, ^{12}\text{Be}')$ E \approx 54 MeV/nucleon, measured E_γ, I_γ , (particle) γ -coin following projectile Coulomb excitation. Deduced angle-integrated $\sigma(\theta)$. ^{12}Be deduced level J, π , excitation B(E1), shell features.
2001Fr02: $^{12}\text{C}(^{12}\text{Be}, 2^6\text{He}), ^{12}\text{C}(^{12}\text{Be}, \alpha^6\text{He})$ E=378 MeV; measured particle spectra, angular distributions. ^{12}Be deduced levels, possible cluster structure.
2002Iw01: $^{12}\text{C}(^{12}\text{Be}, ^{12}\text{Be}')$ E=54.6 MeV/nucleon; measured E_γ, I_γ , (particle) γ -coin. ^{12}Be deduced levels, J, π , transition probabilities, quadrupole collectivity.
2003Sh35: $^{12}\text{C}(^{12}\text{Be}, ^{12}\text{Be}')$ E not given, measured $E_\gamma, I_\gamma, \gamma\gamma$ -coin, angular correlations. ^{12}Be deduced levels, J, π .
2007Ch81: $^{12}\text{C}(^{12}\text{Be}, \text{X})$ E=50 MeV/nucleon, measured charged particle spectra. ^{12}Be measured breakup cross sections for decay modes $\alpha+^8\text{He}, ^6\text{He}+^6\text{He}, ^3\text{H}+^9\text{Li}, \text{P}+^{11}\text{Li}$. Deduced excitation energies.
2011Og06: $^{12}\text{C}(^{12}\text{Be}, \text{X})$ E not given, analyzed data. Deduced energy levels, J, π , diffraction radii.

 ^{12}Be Levels

E(level)	J^π^\dagger	Γ	Comments
0			
$\approx 10.3 \times 10^3 \ddagger$	(0 ⁺)	1.5 MeV 2	The Monopole transition strength for the isoscalar monopole transition, $M(\text{IS}, 0) = 7.0 \text{ fm}^2$ $I_0 = 0.070 \text{ b}$, I_0 , is deduced.
$\approx 11.7 \times 10^3 \#$	(2 ⁺)	$\approx 1 \text{ MeV}$	
$\approx 12.1 \times 10^3 \ddagger$	(2 ⁺)		J^π : Low statistics prevented DWBA analysis of the angular distributions; $J^\pi = 2^+$ is expected based on systematics.
$\approx 13.2 \times 10^3 \#$	(4 ⁺)	$\approx 1 \text{ MeV}$	E(level): See $E_x = 13.0 \text{ MeV}$ (1999Fr04), 13.3 MeV (2015Ya05).
$\approx 13.8 \times 10^3 \ddagger$	(4 ⁺)		E(level): See $E_x = 13.9 \text{ MeV}$ (1999Fr04), 14.1 MeV (2001Fr02), 13.5 MeV (2007Ch81), 13.6 MeV (2015Ya05).
$\approx 14.7 \times 10^3 \ddagger \#$			E(level): See $E_x = 14.7 \text{ MeV}$ (1999Fr04), 14.5 MeV (2007Ch81).
$\approx 15.5 \times 10^3 \ddagger$		$\approx 1.5 \text{ MeV}$	E(level), Γ : From (2007Ch81), see also (1999Fr04, 2001Fr02).
$\approx 16.5 \times 10^3 \ddagger$			E(level): from (1999Fr04, 2001Fr02).
$\approx 17.7 \times 10^3 ? \ddagger$			E(level): from (1999Fr04).
$\approx 18.4 \times 10^3 ? \ddagger$			E(level): from (1999Fr04).
$\approx 19.3 \times 10^3 ? \ddagger$			E(level): from (1999Fr04).
$\approx 20.8 \times 10^3 ? \ddagger$			E(level): from (1999Fr04).

[†] From DWBA analysis of angular distributions and angular correlations for $^6\text{He}+^6\text{He}$ and $^4\text{He}+^8\text{He}$ pairs, except where indicated.

[‡] Observed in the $^4\text{He}+^8\text{He}$ relative energy spectrum.

[#] Observed in the $^6\text{He}+^6\text{He}$ relative energy spectrum. The expected resolution of $\approx 0.8 \text{ MeV}$ has not been unfolded from the listed Γ (2015Ya05).