^{100}Mo(α,α′) 1988Ry02,2015Yo04,2020Ho11

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 172,1 (2021)	31-Jan-2021

1988Ry02: E(α)=32.2 MeV from the tandem Van de Graaff at Heidelberg. Enriched target. Measured σ(θ) data from 10° to 40° (c.m.), with a Q3D spectrograph (FWHM=20 keV). Deduced levels, J, π, deformation lengths from DWBA analysis. Transition rates deduced from deformation parameters; see 1986La18 (from the same group) for details of the experimental arrangement and analysis of results.

2013Yo07, 2015Yo04: E(α)=240 MeV from Texas A&M K500 superconducting cyclotron. Target=self−supporting target foils 5-8 mg/cm^2 of >96% enriched ^{100}Mo. Measured Eα, Iα, α(θ) using multipole-dipole-multipole (MDM) spectrometer at Texas A&M. Deduced isoscalar giant resonances (ISGMR, ISGDR, ISGQR and ISGOR), and E0, E1, E2 and E3 strengths. Comparison with Spherical Hartree-Fock-based random-phase approximation calculations. DWBA analysis of σ(θ) data.

2020Ho11: E(α)=386 MeV from RCNP-Osaka accelerator facility. Measured Eα, Iα, α(θ) using Grand Raiden high-resolution spectrometer. DWBA analysis of angular distributions. Deduced energies, widths and intensities of the isoscalar giant monopole resonances (ISGMR).

See also 2013Yo07.

Others: 1975Bu04 (seven levels given), 1972Ma56, 1971Go36, 1971Go28.

(α,α) E=14-32 MeV: 2003Av04: analyzed σ(θ) data, deduced optical- model parameters.

Additional information 1.

All data for levels up to 3701 are from 1988Ry02. Above this energy, data for giant resonances are from 2015Yo04.

^{100}Mo Levels

Total Isoscalar E0 EWSR=110% *12*, E1 EWSR=55% *7*, E2 EWSR=79% *14*, and E3 EWSR=53% *7* (2015Yo04).

Reduced transition strength in Weisskopf units from 1988Ry02, deduced from deformation lengths. For comparison of these values with those deduced from electromagnetic transitions, see Adopted Levels.

E(level)	L[&]	Comments
0		
526 *20*	2	Transition strength (W.u.)=35.4. β_2R=1.08 fm. Others: 1972Ma56, 1971Go36.
1063 *20*	2	Transition strength (W.u.)=1.1. β_2R=0.19 fm.
1139 *20*	(4)	Transition strength=1.2 *4* (1975Bu04).
1918 *20*	3	Transition strength (W.u.)=40.8. β_3R=0.96 fm. Other: 1972Ma56.
2029 *20*		
2121 *20*	4	Transition strength (W.u.)=3.4. β_4R=0.22 fm.
2183 *20*		
2330 *20*	2	Transition strength (W.u.)=0.4. β_2R=0.12 fm.
2384 *20*	5	Transition strength (W.u.)=8.1. β_5R=0.26 fm.
2416 *20*	3	Transition strength (W.u.)=3.5. β_3R=0.28 fm.
2444 *20*		
2464 *20*	4	Transition strength (W.u.)=8.2. β_4R=0.34 fm.
2566 *20*		
2610 *20*	4	Transition strength (W.u.)=3.4. β_4R=0.22 fm.
2656 *20*	(4,5)	
2707 *20*		
2790 *20*	(4)	Transition strength (W.u.)=2.3.

Continued on next page (footnotes at end of table)

$^{100}Mo(\alpha,\alpha')$ 1988Ry02,2015Yo04,2020Ho11 (continued)

^{100}Mo Levels (continued)

E(level)	J^{π}‡	$T_{1/2}$†	L&	Comments
				β_4R=0.18 fm.
2852 *20*			4	Transition strength (W.u.)=5.1. β_4R=0.27 fm.
2869 *20*			(2)	Transition strength (W.u.)=0.5. β_2R=0.13 fm.
2882 *20*			4	Transition strength (W.u.)=2.8. β_4R=0.20 fm.
2970 *20*			4	Transition strength (W.u.)=4.4. β_4R=0.25 fm.
3029 *20*			(6)	Transition strength (W.u.)=3.6. β_6R=0.13 fm.
3041 *20*			4	Transition strength (W.u.)=3.1. β_4R=0.21 fm.
3085 *20*			5	Transition strength (W.u.)=7.5. β_5R=0.25 fm.
3114 *20*			(5)	Transition strength (W.u.)=2.7. β_5R=0.15 fm.
3153 *20*				
3196 *20*			4	Transition strength (W.u.)=1.6. β_4R=0.15 fm.
3216 *20*			3	Transition strength (W.u.)=1.8. β_3R=0.20 fm.
3276 *20*			(5)	Transition strength (W.u.)=3.4. β_5R=0.17 fm.
3398 *20*			(4)	Transition strength (W.u.)=1.0. β_4R=0.12 fm.
3603 *20*			3	Transition strength (W.u.)=1.0. β_3R=0.15 fm.
3701 *20*			5	Transition strength (W.u.)=5.8. β_5R=0.22 fm.
13.0×10^3# *3*	1^-#	11.6# MeV *12*		%E1 EWSR=18 *3* for ISGDR (2015Yo04).
13.2×10^3@ *4*	0^+@	2.6@ MeV *6*		%E0 EWSR=32 *4* for ISGMR. Other: energy=15.8 MeV, Γ=7.1 MeV, %EWSR=97 (2013Yo07,2015Yo04).
13.60×10^3# *26*	2^+#	4.75# MeV *38*		%E2 EWSR=79 *14* for ISGQR (2015Yo04).
16.8×10^3@ *4*	0^+@	2.5@ MeV *5*		%E0 EWSR=60 *3* for ISGMR. Other: energy=23.6 MeV, Γ=5.5 MeV, %EWSR=14 (2013Yo07,2015Yo04).
21.5×10^3# *4*	3^-#	3.7# MeV *3*		%E3 EWSR=53 *7* for ISGOR (2015Yo04).
30.1×10^3# *7*	1^-#	12.5# MeV *38*		%E1 EWSR=47 *10* for ISGDR (2015Yo04).

† From 2015Yo04.
‡ Natural parity states defined by L-value.
# From 2015Yo04.
@ From 2020Ho11. Values from 2015Yo04 are given under comments. Due to background subtraction procedures in 2013Yo07 and 2015Yo04, as discussed in 2019Ho17 and 2016Gu13, values from 2020Ho11 are preferred here. Further, for ISGMR, there can only be two peaks, as GMR strength splits into two components in case of deformed nuclei, because of the mixing with the K=0 component of the GQR, as discussed in 1980Ga21, and also communication with Prof. U. Garg, Oct 29, 2020.
& From comparison of $\sigma(\theta)$ data to DWBA calculations (1988Ry02).