$^{4}He(^{22}O,^{23}F\gamma)$ 2006Mi16

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	M. S. Basunia[#], A. Chakraborty[##]	NDS 171, 1 (2021)	1-Jun-2020

Others: 2005Sh46, 2005Mi32, 2007Mi25 – All from the same research group and 2006Mi16 supersedes all the other papers.
Based on XUNDL: Compiled by B. Singh and J. Roediger (McMaster), May 16, 2005.
Includes ^{4}He-induced reactions in inverse kinematics: ^{4}He(^{22}O,^{23}Fγ), ^{4}He(^{23}F,^{23}Fγ), ^{4}He(^{24}F,^{23}Fγ), and ^{4}He(^{25}Ne,^{23}Fγ).
Beams of ^{22}O, ^{23}F, ^{24}F, and ^{25}Ne were produced as secondary beams from 63 MeV/nucleon ^{40}Ar primary beam impinging on a ^{9}Be target. Fragments were analyzed by RIPS separator at RIKEN facility. The secondary beam particles were identified event-by-event according to the energy loss signals from a silicon detector and the time of flight between two plastic scintillators at 5 meters apart along the beamline. The secondary beams were allowed to bombard a liquid helium target. The reaction products detected by a ΔE-E telescope. The identification of the reaction products were carried out using time-of-flight (TOF), energy loss(ΔE), and energy (E). The ΔE-E telescope consisted of 9 silicon (for ΔE measurement) and 36 NaI(Tl) (for E measurement) detectors. The gamma rays from the reaction products were detected with an array (DALI2) of 150 NaI(Tl) detectors. Measured Eγ, $\gamma\gamma$, $\gamma(\theta)$ and angular distribution of the outgoing ^{23}F particles.
Relative cross sections of population of levels are given by 2006Mi16 in a bar chart.

^{23}F Levels

E(level)[a]	J$^{\pi}$	L	Comments
0.0	(5/2^{+})		J$^{\pi}$: From Adopted Levels.
2268[†‡@] *21*	(1/2^{+})	(0)	(2J+1)C^{2}S=0.73 *+21−33*, C^{2}=isospin Clebsch-Gordan coefficient. L: from observed population strength of the state in α inelastic scattering, proton transfer in (^{22}O,^{23}F), DWBA comparison.
2920[‡#@] *22*			
3.38×10^{3}[&] *3*			
3833[&] *25*			
3.86×10^{3}[&] *4*			
3.96×10^{3}[#] *4*			
4.06×10^{3}[†] *4*	(3/2^{+})	(2)	(2J+1)C^{2}S=0.95 *+29−35*, C^{2}=isospin Clebsch-Gordan coefficient. L: from observed population strength of the state in α inelastic scattering, proton transfer in (^{22}O,^{23}F), DWBA comparison. Configuration: $\pi d_{3/2}$ (2006Mi16).
4.62×10^{3}[†@] *4*			
4.73×10^{3}[&] *7*			
4.92×10^{3}[†‡#] *3*			
5.54×10^{3}[#@] *3*			
5.56×10^{3}[†] *6*			
6.37×10^{3}[†] *7*			
6.63×10^{3}[@] *4*			
6.91×10^{3}[†‡] *6*			

[†] Populated in (^{22}O,^{23}Fγ).
[‡] Populated in (^{23}F,^{23}Fγ).
[#] Populated in (^{24}F,^{23}Fγ).
[@] Populated in (^{25}Ne,^{23}Fγ).
[&] Populated in all four reactions.
[a] From Eγ and recoil correction.

^{4}He(^{22}O,^{23}Fγ) 2006Mi16 (continued)

γ(^{23}F)

E_γ[†]	E_i(level)	J_i^π	E_f	J_f^π	Comments
913 *10*	3833		2920		E_γ: Uncertainty from 7 (stat) 7 (syst).
1240 *15*	4.62×10^3		3.38×10^3		E_γ: Uncertainty from 12 (stat) 9 (syst).
1696 *28*	3.96×10^3		2268	(1/2$^+$)	E_γ: Uncertainty from 25 (stat) 13 (syst).
1706 *25*	6.63×10^3		4.92×10^3		E_γ: Uncertainty from 21 (stat) 13 (syst).
1711 *15*	5.54×10^3		3833		E_γ: Uncertainty from 8 (stat) 13 (syst).
2003 *19*	4.92×10^3		2920		E_γ: Uncertainty from 12 (stat) 15 (syst).
2268 *21*	2268	(1/2$^+$)	0.0	(5/2$^+$)	E_γ: Uncertainty from 12 (stat) 17 (syst).
2644 *53*	5.56×10^3		2920		E_γ: Uncertainty from 49 (stat) 20 (syst).
2920 *22*	2920		0.0	(5/2$^+$)	E_γ: Uncertainty from 3 (stat) 22 (syst).
3378 *28*	3.38×10^3		0.0	(5/2$^+$)	E_γ: Uncertainty from 11 (stat) 26 (syst).
3445 *60*	6.37×10^3		2920		E_γ: Uncertainty from 54 (stat) 26 (syst).
3858 *38*	3.86×10^3		0.0	(5/2$^+$)	E_γ: Uncertainty from 24 (stat) 29 (syst).
3985 *51*	6.91×10^3		2920		E_γ: Uncertainty from 41 (stat) 30 (syst).
4059 *33*	4.06×10^3	(3/2$^+$)	0.0	(5/2$^+$)	E_γ: Uncertainty from 11 (stat) 31 (syst).
4732 *69*	4.73×10^3		0.0	(5/2$^+$)	E_γ: Uncertainty from 59 (stat) 36 (syst).

† Statistical and systematic uncertainties in quadrature (systematic uncertainty 0.76% of Eγ – Fig. 3. caption – 2006Mi16).

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Level Scheme