^{9}Be(^{65}Mn,^{64}Crγ)   **2021Ga02**

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Balraj Singh and Jun Chen	NDS 178, 41 (2021).	12-Nov-2021

Includes ^{9}Be(^{66}Fe,^{64}Crγ) and ^{9}Be(^{68}Co,^{64}Crγ) reactions, with composite ^{66}Fe+^{68}Co beam.

2021Ga02: E(^{65}Mn) and E(^{66}Fe,^{68}Co)=90-95 MeV/nucleon from 140 MeV/nucleon ^{82}Se primary beams from the Coupled Cyclotron Facility at NSCL-MSU incident on ^{9}Be production targets. Beams of ^{66}Fe and ^{68}Co could not be separated. Reaction fragments were separated and selected by the A1900 separator and impinged on a ^{9}Be secondary target. Projectile-like recoils were identified by the detector system of the S800 spectrograph consisting of a 16-fold ionization chamber for energy-loss measurement and two scintillators for time-of-flight; γ rays were detected with the GRETINA array of fifteen 36-fold segmented HPGe detectors. Measured Eγ, Doppler-shifted γ spectra, $\gamma\gamma$- and (particle)γ-coin. Comparison with calculated level scheme and B(E2) strengths based on shell-model with LNPS effective interaction, and deduced evidence of collective structure.

^{64}Cr Levels

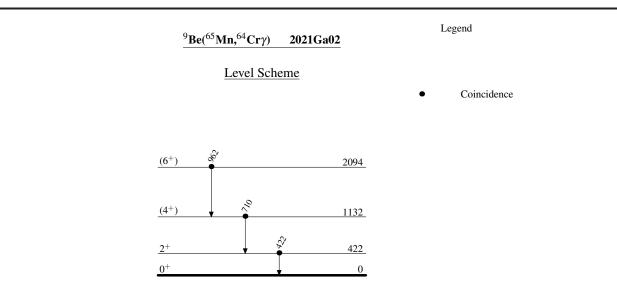| E(level)[†]	J$^{\pi}$[‡]	Comments
0	0$^+$	
422 6	2$^+$	E(level): 462, first 2$^+$ predicted from shell-model calculations (2021Ga02).
1132 9	(4$^+$)	E(level): 1202, first 4$^+$ predicted from shell-model calculations (2021Ga02).
2094 11	(6$^+$)	E(level): 2156, first 6$^+$ predicted from shell-model calculations (2021Ga02), where the second 2$^+$ state is predicted at 1827 keV.

[†] From Eγ values.
[‡] As given by 2021Ga02.

γ(^{64}Cr)

E$_\gamma$	E$_i$(level)	J$_i^{\pi}$	E$_f$	J$_f^{\pi}$	Comments
422 6	422	2$^+$	0	0$^+$	E$_\gamma$: from 423 6 in (^{65}Mn,^{64}Cr) reaction, and 420 7 in (^{66}Fe,^{64}Cr)+(^{68}Co,^{64}Cr). More precise energy is 430 2 from ^{64}V β^- decay (2014Su11).
710 6	1132	(4$^+$)	422	2$^+$	E$_\gamma$: from 710 6 in (^{65}Mn,^{64}Cr) reaction, and 711 6 in (^{66}Fe,^{64}Cr)+(^{68}Co,^{64}Cr).
962 7	2094	(6$^+$)	1132	(4$^+$)	E$_\gamma$: from summed γ-ray spectrum from all the three reactions. Others: 962 7 in (^{65}Mn,^{64}Cr) reaction, and 964 8 in (^{66}Fe,^{64}Cr)+(^{68}Co,^{64}Cr).
^{x}1016[†] 8					
^{x}1200[‡] 10					
^{x}1233[†] 9					Uncertain γ ray.
^{x}1518[†] 7					E$_\gamma$: 1520 from projection of $\gamma\gamma$-coin matrix.
^{x}1667[†] 10					Uncertain γ ray.

[†] From summed γ-ray spectrum from all the three reactions.
[‡] From projection of $\gamma\gamma$-coin matrices.
[x] γ ray not placed in level scheme.

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<u>Level Scheme</u>

Legend

•   Coincidence

$^{64}_{24}Cr_{40}$