^{197}Au(^{31}Na,^{31}Na$'\gamma$)   **2001Pr01,2002Pr12**

History

Type	Author	Citation	Literature Cutoff Date
Full Evaluation	Jun Chen and Balraj Singh	NDS 184, 29 (2022)	24-Jun-2022

Mainly Coulomb interaction.

2001Pr01: E=58.9 MeV/nucleon ^{31}Na beam was produced by fragmentation of 80 MeV/nucleon ^{48}Ca primary beam on a ^{9}Be target at NSCL. Fragments were separated by A-1200 fragment separator and impinged a 702 mg/cm^2 ^{197}Au target. Reaction products and scattered particles were detected and identified by a zero degree phoswich detector (ZDD). γ rays were detected in coincidence with ^{31}Na ions using an array of NaI(Tl) detectors surrounding the target. Measured Eγ, particle-γ-coin, σ. Deduced levels, J, π, charge and mass deformations. Comparisons with shell-model calculations.

2002Pr12: Reanalysis of data in 2001Pr01.

^{31}Na Levels

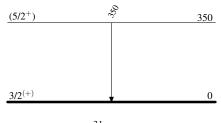| E(level)	J$^{\pi\ddagger}$	Comments
0†	3/2$^{(+)}$	
350† *20*	(5/2$^+$)	B(E2)↑=0.031 +*17*−*13* (2002Pr12) J$^\pi$: 7/2$^+$ would require unlikely β_2=0.94 (2001Pr01). B(E2)↑: from re-analysis of data in 2001Pr01 with β_C=0.66 *16*, β_A=0.74 *18*, and intrinsic quadrupole moment Q$_0$=78 fm^2 *19*, assuming equal excitations of this level and the 7/2$^+$ level. β_2=0.59 *10* from 2001Pr01 assuming 95% deexcitation of the 7/2$^+$ level feeds this level and Coulomb deformation parameter β_C=0.59 *10* is equal to nuclear matter deformation parameter β^A.
(1163)	7/2$^+$	E(level): rounded value from Adopted Levels. 2002Pr12 claim that it is certain this level is populated in this reaction but no γ transition deexciting this level is observed.

† Possible member of K^π=3/2$^+$ band.
‡ As given in 2001Pr01.

γ(^{31}Na)

E$_\gamma$	E$_i$(level)	J$_i^\pi$	E$_f$	J$_f^\pi$	Comments
350 *20*	350	(5/2$^+$)	0	3/2$^{(+)}$	σ=115 mb *32* for 350γ (2001Pr01).

^{197}Au(^{31}Na,^{31}Na$'\gamma$)   **2001Pr01,2002Pr12**

Level Scheme

(5/2$^+$)   350   350

3/2$^{(+)}$ 0

$^{31}_{11}$Na$_{20}$

$^{31}_{11}$Na$_{20}$-2

^{197}Au(^{31}Na,^{31}Na$'\gamma$)   **2001Pr01,2002Pr12**