

$^{160}\text{Gd}(\text{p,p}'),(\text{pol p,p}') \quad \text{1966Sh05,1987Ic04}$

Type	Author	History Citation	Literature Cutoff Date
Full Evaluation	N. Nica	NDS 176, 1 (2021)	1-May-2021

Additional information 1.

1987Ic04: (pol p,p') enriched (98.10% ^{160}Gd) target. $E(\text{p})=65$ MeV, beam polarization=80-85%, energy resolution=20-26 keV (FWHM). High resolution spectrograph, position-sensitive proportional counter and $\Delta E/E$ counters. Measured momentum spectra, $\sigma(\theta)$ and analyzing powers from $\theta(\text{lab})=10^\circ$ to 36° in 1° steps and from 36° to 70° in 2° steps. Coupled-channel analyses, assuming γ -vibrational model and asymmetric-rotor model. Deduced Y_{22} and Y_{42} transition strengths to γ -vibrational band, optical-potential and deformation parameters.

See **1988Ic02** for an overview of the systematics of the Y_{22} and Y_{42} strengths of the γ vibrations of the strongly deformed nuclides in the "rare-earth" region, as determined through polarized-proton inelastic scattering.

1966Sh05: (p,p') $E(\text{p})=12.0$ MeV. Magnetic spectrograph. Measured p' , $\theta=133^\circ$. J^π assignments made through analogy with known excited states in ^{158}Gd , ^{160}Dy , and ^{164}Dy .

1995An28: (p,p') reaction, $E(\text{p})=22$ MeV, on self-supporting target, thickness=1.08 mg/cm² and enrichment=98.1%. p' analyzed using a Q3D magnetic spectrometer and detected in a position-sensitive and a $\Delta E/E$ detector. $E(p')$ assumed to be accurate to within 10-15 keV. Report new ^{160}Gd levels at 1798, 1870, 2253, 2349, 2400, 2558 and 2607. Measure $p'(\theta)$ but report information only for the two highest-energy levels, which are proposed to have $J^\pi=3^-$ and 4^+ , respectively. Use absence of certain 1^+ levels (M1 excitations) in the p' spectrum at 10° to conclude that they are "orbital" in character. See, also, the comments in the $^{160}\text{Gd}(\gamma,\gamma')$ data set.

 ^{160}Gd Levels

$E(\text{level})^\dagger$	J^π^\ddagger	Comments
0.0 [#]	0^+	
76 [#]	2^+	
247 [#]	4^+	
513 [#]	6^+	
989 [@] 2	2^+	$B(E2)=0.1158 \ 50$ (isoscalar transition strength, 1987Ic04).
1060 [@] 5	3^+	J^π : assigned as (3^+) by 1966Sh05 .
1149 [@] 5	4^+	$B(E4)=0.0242 \ 12$ (isoscalar transition strength, 1987Ic04).
1226 5	1^-	J^π : assigned as (2^-) by 1966Sh05 .
1291 2	3^-	
1465 4	(3^-)	J^π : assigned as (5^-) by 1966Sh05 .

[†] From **1966Sh05**.

[‡] From Adopted Levels.

[#] Band(A): g.s. rotational band.

[@] Band(B): γ -vibrational band.

 $^{160}\text{Gd}(\text{p,p}')(\text{pol p,p}')$ 1966Sh05,1987Ic04

Band(B): γ -vibrational
band

4⁺ 1149

3⁺ 1060

Band(A): g.s. rotational
band

2⁺ 989

6⁺ 513

4⁺ 247

2⁺ 76

0⁺ 0.0