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ENSDF MODEL EXAMPLES: I
Reaction Datasets

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^{192}Pt: from ^{190}Os(α,2nγ), ^{192}Os(α,4nγ)
^{91}Nb: from ^{89}Y(α,2nγ), ^{93}Nb(α,α'2nγ)
^{166}Os: from ^{106}Cd(^{64}Zn,2p2nγ)
^{186}W: from Coulomb Excitation
^{169}Ho: from ^{170}Er(pol t,α)
^{59}Fe: from ^{58}Fe(d,p), (pol d,p)
^{59}Fe: from ^{58}Fe(d,pγ)
^{59}Fe: from ^{59}Co(n,p)
^{166}Ho: from ^{165}Ho(n,γ) E=thermal
^{170}Tm: from ^{169}Tm(n,γ) E=thermal: two-photon cascades
^{170}Tm: from ^{169}Tm(n,γ) E=2, 24 keV
^{170}Tm: from ^{169}Tm(d,p)
^{170}Tm: from ^{170}Er(^{3}He,t)
^{92}Mo: from ^{92}Mo(d,d'), (pol d,d)
^{170}Tm: from ^{171}Yb(t,α)
^{170}Er: from ^{170}Er(γ,γ'), (γ, pol γ') (resonance fluorescence)
^{59}Co: from ^{58}Fe(p,p')
^{93}Nb: from ^{92}Zr(p,p'), (pol p,p) IAR

^{190}Os(α,2nγ), ^{192}Os(α,4nγ)

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192PT     190OS(A,2NG), 192OS(A,4NG)     1976CU02,1976HJ01          98NDS    199809
192PT  H TYP=FUL$AUT=Coral M. Baglin$CIT=NDS 84, 717 (1998)$CUT=1-Aug-1998$
192PT C   Others: 1965LA02, 1974YA03, 1975FU04, 1975PI02, 1978TI02, 1979FUZN,
192PT2C   1981HJ01.
192PT C   1976CU02: E(A)=28-50 MEV; osmium targets enriched to 95% in
192PT2C   190OS (for (A,2NG)), to 98% in 192OS (for (A,4NG));
192PT3C   measured EG, IG (GELI, FWHM=2.1 KEV at 1332 KEV; low-energy photon
192PT4C   spectrometer, FWHM=650 EV
192PT5C   at 122 KEV), prompt and delayed GG coin, three-parameter
192PT6C   GG(T) coin, G-ray angular distributions (90 DEG to 140 DEG
192PT7C   (5 angles)). See also 1975PI02.
192PT C   1976HJ01: E(A)=23-27 MEV, osmium targets enriched to 79% in
192PT2C   190OS (for (A,2NG)); E(A)=43-51 MEV, osmium targets enriched
192PT3C   to 98% in 192OS (for (A,4NG)); measured EG, IG (GELI,
192PT4C   including system with FWHM=550 EV at 100 KEV), ECE, ICE (magnet with
192PT5C   SILI), prompt and delayed GG coin, G-ray angular
192PT6C   distributions, relative G-ray yields for (A,2NG) at 27 MEV and (A,4NG)
192PT7C   at 48 MEV (see also 1975FU04).
192PT C   The level scheme and all data are from 1976CU02 and 1976HJ01,
192PT2C   except where noted. Additional data are available from 1974YA03,
192PT3C   1978TI02, and 1979FUZN. 1981HJ01 report average spin distributions and
192PT4C   deexcitation G multiplicities for quasicontinuum levels excited in
192PT5C   192OS(A,4NG) at EA=51-55 MEV.
192PT CG            See 1976CU02 and 1976HJ01 for RI (other conditions),
192PT2CG additional angular distribution coefficients, and coincidence data.
192PT CG E          From 1976CU02, except where noted (192OS(A,4NG),
192PT2CG E(A)=45.5 MEV, |q=125 DEG).
192PT CG RI         IG from 192OS(A,4NG), E(A)=45.5 MEV,
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192PT2CG THETA=125 DEG, except where noted (1976CU02); values are relative to
192PT3CG I(316.5G)=100.
192PT CG M         From CE data (1976HJ01) and/or G-ray angular distributions,
192PT2CG except where noted; the photon and CE intensity scales were
192PT3CG normalized through KC=0.0539 (E2 theory) for 316.5G. Stretched Q
192PT4CG assignments from G(|q) are based on large positive A2 and
192PT5CG small negative A4.
192PT CL J         Authors' values from G-ray multipolarities, coincidence
192PT2CL data, and band structure (from 1976HJ01, except as noted). See 192PT
192PT3CL adopted levels for evaluator's assignments.
192PT CL BAND(A)   K=0 GS BAND.
192PT CL BAND(B)   K=2 QUASI-G VIBRATION BAND.
192PT CL BAND(D)   PI=+ BAND, YRAST FOR J GE 10.
192PT CL BAND(E)   SEMIDECOUPLED PI=- BAND.
192PT2CL BUILT ON the 5- two-quasiparticle excitation.
192PT CL BAND(G)   PI=- BAND.
192PT2CL Built on 10- isomer (probable
192PT3CL configuration=((|n 9/2[505])+(|n 11/2[615])).
192PT CG E(A)      From 1976HJ01 (192OS(A,4NG), E(A)=46 MEV,
192PT2CG THETA=125 DEG); uncertainties range from 0.1 to 0.3 KEV.
192PT CG E(B)      From 1974YA03 (190OS(A,2NG), E(A)=24 MEV).
192PT CG E(EF)     G-ray associated with GT 3-ns delay (1976HJ01).
192PT CG M(HI),MR(GI)$From G-ray angular distributions in 1979FUZN.
192PT CG MR(DF)    From CE data and G-ray angular distributions in
192PT2CG 1976HJ01.
192PT  N
192PT PN                                                                  C5
192PT2PN RELATIVE RI FOR 192OS(A,4NG), E(A)=45.5 MEV, THETA=125 DEG
192PT  G 388.4     3                                                      B
192PT  G 398.73    23 2.0    3
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192PT  G 407.0                                                          A
192PT CG           Assignment to 192PT uncertain (1976HJ01); EG=407.23 10 in
192PT2CG 1974YA03.
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192PT  G 886                                                            A
192PT CG           Deexcites E(level)>5000 (1976HJ01).
192PT  L 0.0          0+                STABLE                          A
192PT  L 316.50    5  2+                                                A
192PT  G 316.50    5  100       E2                     0.085            E
192PT CG M         K:L:M=20:10:3.6.
192PT2CG A2=+0.25 2, A4=-0.03 3 (1976HJ01).
---------------------------
192PT  L 920.88    14 3+                                                B
192PT  G 308.44    12 3.4    3  M1+E2    +7      2     0.096  4         I
192PT CG M         adopted T and RUL exclude DPI=yes option from G(|q).
192PT2CG A2=+0.28 3, A4=-0.01 6 (1976HJ01).
192PT  G 604.34    20                                                   B
192PT CG E         604.4 (uncertainty LE 0.3) in 1976HJ01.
192PT  L 1201.07   16 4+                                                B
192PT  G 416.8     5  1.1    4  M1+E2    +6      2     0.042  3         I
192PT CG M         MR unreasonably large for E1+M2.
192PT  G 588.67    20 2.8    3 Q                                       H
192PT CG           A2=+0.23 9, A4=-0.01 15 (1976HJ01).
192PT  G 884.5        0.23    8
192PT CG RI$deduced from
192PT2CG RI(416.8G):RI(588.7G):RI(884.5G)=18.0 11:100:7.1 15 (1979FUZN).
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^{89}Y(α,2nγ), ^{93}Nb(α,α'2nγ)

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 91NB    89Y(A,2NG), 93NB(A,A'2NG)     1979FI06,1975SC30,1974BE3699NDS    199902
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91NB  H TYP=FUL$AUT=Coral M. Baglin$CIT=NDS 86, 1 (1999)$CUT=15-Dec-1998$
91NB D  1973BeYD UNAVAILABLE SO NOT CHECKED (Jul. '98)
91NB C  Others: 1979Pl05, 1977Ba34, 1976Ba50, 1976Ba02, 1973BeYD.
91NB C  1979Fi06: (A,2NG); E=24.0 MEV, 35.7 MEV; measured EG, IG,
91NB2C  G(|q), G(T).
91NB C  1976Ba50: (A,2NG); E=24.6 to 27.8 MEV; coaxial and planar GELI,
91NB2C  scin detectors; measured EG, IG, G(|q) at seven angles for
91NB3C  EA=24.7 MEV, G(T), GG coin at EA=26 MEV, particle-|g coin,
91NB4C  G excit; shell-model level-energy calculations.
91NB C  1976Ba02: (A,2NG); E=21 MEV; NAI(TL), GE(LI) detectors.
91NB2C  Measured |a-G(|q,H,T); deduced ^T{-1/2}, g-factor for 13/2-
91NB3C  1984 level.
91NB C  1975Sc30: (A,A'2NG); E=48 MEV, pulsed beam; measured |a-CE(T).
91NB C  1974Be36: (A,2NG); E=17 MEV to 25 MEV, pulsed beam; measured
91NB2C  EG, IG, I(x), G(|q), G(T), G excit.
91NB C  1973BeYD: (A,2NG); E=17.3 MEV to 19.8 MEV. The energy has been
91NB2C  chosen just above the threshold for each level.
91NB3C  GE(LI). Measured EG and DSA.
91NB CL E         From least-squares adjustment of EG, assigning |DE{-|g}=1
91NB2CL KEV whenever no G deexciting a given level has been assigned
91NB3CL an uncertainty by the authors.
91NB CL J         Authors' values, based primarily on G(|q); from 1976Ba50 for
91NB2CL E(level)<3500, and from 1979Fi06 for higher energy levels,
91NB3CL except as noted.
91NB CL T         For values from DOPPLER-shift attenuation, experimental
91NB2CL uncertainties only are quoted; an additional
91NB3CL uncertainty of 20% should be added to account for the error
91NB4CL in the slowing-down theory (1973BeYD). Additionally, T<4 NS
91NB5CL for all levels above 3500 KEV (1979Fi06).
91NB CG E         From 1979Fi06, except as noted. Values taken from fig. 3
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91NB2CG of 1979Fi06 are of unknown precision.
91NB CG RI        Relative intensity at 35.7 MEV (1979Fi06), except as noted.
91NB2CG Data given without uncertainty are from fig. 3 of 1979Fi06.
91NB CG M,MR      From G(|q) (1979Fi06), if not indicated otherwise.
91NB CG M(A,E),MR(A,E)$Based on G(|q) from 1974Be36.
91NB CG E(B)      From 1974Be36.
91NB CG E(D,E)    From 1973BeYD.
91NB CG E(F)      Observed only by 1976Ba50.
91NB CG E(G)      180.0 5 in table 1 of 1979Fi06, but 185.0 in figs. 1 and 3;
91NB2CG the latter value is in accord with datum from (6LI,3NG).
91NB CL T(T)      From DOPPLER-shift attenuation (1973BeYD).
91NB PN                                                                  C5
91NB2PN RELATIVE RI FROM (A,2NG) AT 35.7 MEV
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91NB  G 2117.5    7                                                      B
91NB CG           Placed by 1974Be36 from 2119 level, but EG inconsistent with
91NB2CG adopted value; also, RI(328):RI(2120)=3:10 (1976Ba50) is inconsistent
91NB3CG with adopted branching from that level.
91NB  L        0    9/2+
91NB CL J         from adopted levels.
91NB  L    102.0   71/2-
91NB CL J         from adopted levels.
91NB  G 102.0     7                                                        S
91NB CG E         G not observed in this experiment. E from level energy
91NB2CG difference.
91NB  L   1184.4   7 5/2-             2.6 PS    +15-7                     T
91NB  G 1082.4    2 3          E2                                        E
91NB CG           A2=+0.23 3, A4=-0.03 3 (1976Ba50). Other: 1974Be36.
91NB CG M         Q from G(|q), not M2 from RUL.
91NB  L   1310.1   83/2-              0.166 PS  17                       T
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 91NB   G 1208.1     3                                                    D
 91NB   L  1580.61   10 7/2+              0.33 PS   3                     T
 91NB   G 1580.6     1             M1+E2     +0.24   +10-9                D
 91NB CG             A2=-0.38 6, A4=+0.03 5 (1976Ba50). Other: 1974Be36.
 91NB CG M           ^D+Q from G(|q), not E1+M2 from RUL.
 91NB   L   1609.6    83/2-               0.054 PS  12                    T
 91NB CL J           from adopted levels.
 91NB   G 1507.6     2                                                    D
-----------------
 91NB   L  1983.95   17 13/2-             10.0 NS   4
 91NB2 L G=+1.26 4
 91NB CL G           From time-differential perturbed angular distribution
 91NB2CL (1976Ba02).
 91NB CL T           from |a-G(T) (1976Ba02). Other: 8 NS 2 (1976Ba50).
 91NB   G 193.5      1 26.7    7 (E2)
 91NB CG             A2=+0.19 2, A4=0.00 1 (1979Fi06). Other: 1976Ba50.
 91NB CG M           (Q) from G(|q), not M2 from RUL.
 91NB   G 1983.9     2 78.8    9 (M2)
 91NB CG             A2=+0.15 4, A4=-0.03 3 (1979Fi06). Others: 1974Be36,
 91NB2CG 1976Ba50.
 91NB CG M           Q from G(|q), DPI=yes from level scheme.
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^{106}Cd(^{64}Zn,2p2nγ)

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166OS     106CD(64ZN,2P2NG)                2002AP03
166OS   H TYP=FUL$AUT=C. M. BAGLIN$CIT=NDS 109, 1103 (2008)$
166OS C   2002AP03: E(64ZN)=334 MEV; 80% ENRICHED 106CD TARGET; ^JUROSPHERE
166OS2C   DETECTOR ARRAY (5 ^NORDBALL (AT 79 DEG), 5 ^TESSA (AT 101 DEG) AND 15
166OS3C   ^EUROGAM PHASE ^I (AT 134 DEG OR 158 DEG) Ge DETECTORS); ^RITU
166OS4C   GAS-FILLED SEPARATOR; RECOILS IMPLANTED INTO 16-STRIP
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166OS5C  POSITION-SENSITIVE SI DETECTOR; RECOIL DECAY TAGGING TECHNIQUE;
166OS6C  MEASURED EG, IG, RECOIL-|a-G-G COIN, G ASYMMETRY.
166OS CG E,RI       FROM 2002AP03.
166OS CG M          BASED ON G ASYMMETRY IN RECOIL-|a-G DATA, EXCEPT AS NOTED.
166OS2CG VALUES FOR 165W TRANSITIONS OF KNOWN MULTIPOLARITY, ALSO OBSERVED IN
166OS3CG THIS EXPERIMENT, SERVED AS AN ASYMMETRY CALIBRATION.
166OS4CG VALUES EXPECTED FOR PURE STRETCHED ^D ARE
166OS5CG ~0.55 AND, FOR STRETCHED Q (OR ^D, DJ=0), ~1.0.
166OS CL E          FROM LEAST-SQUARES FIT TO EG.
166OS CL J          AUTHORS' VALUES, BASED ON DEDUCED BAND STRUCTURE, MEASURED
166OS2CL TRANSITION MULTIPOLARITIES AND ANALOGY TO STRUCTURES IN 168OS.
166OS CL BAND(A)    YRAST SEQUENCE.
166OS2CL GS BAND CROSSED AT ~h|w=0.30 MEV (WITH ~11 ~h GAIN IN ALIGNMENT) BY
166OS3CL (|n i{-13/2}{+2}) BAND (2002AP03).
166OS CL BAND(B)    KPI=(3-), |a=1 BAND.
166OS2CL BANDHEAD DEEXCITES TO J=2 AND 4 MEMBERS OF GS BAND; STRUCTURE OF BAND
166OS3CL APPEARS TO BE SIMILAR TO THAT OF A 3- BAND IN 168OS.
166OS4CL POSSIBLE CONFIGURATION: |n (i{-13/2})(h{-9/2},f{-7/2}).
166OS CL BAND(C)    PI=(-), |a=0 BAND.
166OS2CL VERY WEAK BAND DECAYING THROUGH THE (3-) BAND, ANALOGOUS TO A SIDE BAND
166OS3CL KNOWN IN 168OS; ON THIS BASIS, AUTHORS TENTATIVELY ASSIGN PI=- AND
166OS4CL EVEN SPIN.
166OS5CL POSSIBLE CONFIGURATION: |n (i{-13/2})(h{-9/2},f{-7/2}).
166OS PN                                                                  5
166OS  G  171.3     5 7       3
166OS CG            IG(158 DEG)/(IG(79 DEG)+IG(101 DEG))=0.74 8.
166OS CG            AUTHORS SUGGEST THAT THIS G MAY BELONG TO DECAY FROM (3-)
166OS2CG BAND TO YRAST BAND.
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166OS  L 0.0          0+                                                  A
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166OS  L 432.0      3 2+                                                A
166OS  G  432.0     3 100     2 E2                     0.0330
166OS CG           IG(158 DEG)/(IG(79 DEG)+IG(101 DEG))=0.90 3.
166OS CG M         Q FROM G ASYMMETRY; NOT M2 FROM INTENSITY BALANCE AT 432
166OS2CG LEVEL.
166OS  L 1021.0     5 4+                                                A
166OS  G  589.2     4 78      2 Q
166OS CG           IG(158 DEG)/(IG(79 DEG)+IG(101 DEG))=0.92 6.
166OS  L 1562.3     7 (3-)                                              B
166OS  G  541.6     7 17      6 D
166OS CG           IG(158 DEG)/(IG(79 DEG)+IG(101 DEG))=0.66 7.
166OS  G  1129.2    9 25      6
166OS  L 1725.0     7 6+                                                A
166OS CL E         AN ALTERNATIVE VALUE (E=1647.3) IS POSSIBLE BECAUSE THE
166OS2CL ORDER OF THE 626G-704G CASCADE IS NOT ESTABLISHED.
166OS  G  704.0     5 33      9 Q
166OS CG           IG(158 DEG)/(IG(79 DEG)+IG(101 DEG))=0.88 8.
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^{186}W: from Coulomb Excitation

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186W     COULOMB EXCITATION            1989KU04,1977MC11,1971MI08
186W   H TYP=FUL$AUT=CORAL M. BAGLIN$CIT=NDS 99, 1 (2003)$CUT=4-Apr-2003$
186W  C  Others: 1958Mc02, 1959Bi10 (EP=2.8 MEV), 1961Ha21 ((p,p') and (d,d')),
186W 2C  1962Bi05 (EA=3 MEV), 1967As03 (16O,16O'G), 1967Gi02 (16O,16O'G),
186W 3C  1967Ku07 (P,P'G), 1968St13 (EA=8 MEV), 1969Ch23 (EA=8 MEV), 1970Me09
186W 4C  (EA=6 MEV), 1971Ob02 (EA=6 MEV), 1972Hi14 (EP=3 MEV), 1974Ba81
186W 5C  (EA=11.5-13.5 MEV), 1974Br31 (EA=10-20 MEV), 1974Le16 (EA=12.5-19
186W 6C  MEV), 1975Le22 (EA=13.25-19 MEV), 1979Hu01, 1985St07 (E(63CU)=220 MEV),
186W 7C  1986Bi13 (E(32S)=100 MEV), 2000WHZZ(E(238U)=1600 MEV.
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186W  C  For determinations of transient-field strength and precession, see,
186W 2C  e.g., 1991St04, 1988St16, 1987St14.
186W  C  1971Mi08: (X,X'G); x=p, E=5.0, 5.08 MEV; x=a, E=14, 15 MEV; x=16O,
186W 2C  E=45.1, 45.5 MEV.
186W  C  1977Mc11: (X,X'G); x=|a, E=15 MEV; x=16O, E=42 MEV.
186W  C  1979Hu01: (84KR,84KR'G) E=340 MEV, 98.5% 186W target.
186W  C  1989Ku04: (208PB,208PB'G), E(208PB)=4.9 MeV/u; AP 95% 186W target;
186W 2C  measured EG, yield at 12 angles;
186W 3C  observed multiple COULOMB excitation of GS band (J LE 14),
186W 4C  |g band (J LE 12) and quasi-|b band (J=0 and 2); extracted
186W 5C  electromagnetic matrix elements for PI=+ yrast band.
186W  C  See also 1996Wu10 for extraction and
186W 2C  discussion of intrinsic E2 matrix elements between |DK=2 bands.
186W  CG E          From 1977Mc11, unless noted otherwise.
186W  CG RI         Relative photon branching from 1971Mi08, except as noted.
186W  CG M          From 1971Mi08, based on G anisotropy, except as noted.
186W  CG E(J)       1989Ku04 give EG=264.2 in table 1; evaluator presumes this is
186W 2CG typographical error for EG=274.2 (based on spectrum of fig. 1 and
186W 3CG systematics of EG for analogous transitions in 182W, 184W, 186W).
186W 4CG EG=274 in both 1979Hu01 and 1977Mc11.
186W  CG E(K)       From 1989Ku04; uncertainty not stated by authors.
186W  CG E(L)       Approximate value read by evaluator from spectrum in fig.1
186W 2CG of 1989Ku04 (DE AP 5 KEV); authors do not quote EG or E(level).
186W  CG M(M)       From 1977Mc11.
186W  CL            Band assignments shown here are from Adopted Levels. Note
186W 2CL that 1989Ku04 assign the 1006 level as the J=4 member of the |g
186W 3CL band, whereas 1977Mc11 suggest that it is the J=2 member of the |b
186W 4CL band. The basis for the latter assignment is unclear; such an
186W 5CL assignment is inconsistent with adopted JPI(1006), so it is presumed
186W 6CL to be in error. The 1030 level is adopted as the J=2 member of the
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186W 7CL |b band.
186W  CL E          From least-squares adjustment of EG, allowing DE=1 KEV
186W 2CL for transitions for which authors do not quote DE.
186W  CL T          Calculated by the evaluator from measured BE2 and adopted
186W 2CL branching.
186W  CL J          From direct E2 COULOMB excitation (1977Mc11), except as
186W 2CL noted.
186W  CL E(L)       Reported to have been observed by 1989Ku04; E(level) is
186W 2CL rounded-off value from Adopted Levels.
186W  CL J(M)       From band structure deduced by 1989Ku04, based on GG coin
186W 2CL data and energy and intensity systematics.
186W  CL J(N)       E2 G to (J-2) member of same band in multiple COULOMB
186W 2CL excitation.
186W  CL BAND(A)    GS BAND (1989Ku04).
186W  CL BAND(B)    K=2 |g BAND (1989Ku04).
186W 2CL Note that the 1006 level, adopted here as the 4+ member of this band,
186W 3CL was presumed to be the 2+ member of the |b band in 1977Mc11.
186W  CL BAND(C)    K=0 |b BAND.
186W 2CL Only weakly populated (J=0 and 2 members) in 1989Ku04. Authors do not
186W 3CL indicate E(level) or deexciting transitions for either member.
186W  CL BAND(D)    KPI=2- BAND.
186W 2CL K=2 based on Alaga rules for transitions from the 3- member to
186W 3CL the J=2 and 3 members of the |g band (1977Mc11).
186W  PN                                                                  6
186W   L 0            0+                                                 A
186W  CL J          from Adopted Levels.
186W   L 122.6      7 2+                  1.05 NS 3                      A
186W B L BE2=3.42 5
186W  CL BE2        weighted average of 3.50 6 (1968St13), 3.37 8 (1974Br31) and
186W 2CL 3.35 7 (1975Le22). Others: 3.6 4 (1958Mc02), 3.57 25 (1961Ha21),
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186W 3CL 3.35 11 (1974Le16), 3.4 3 (1989Ku04) from coulomb excitation, and 3.46
186W 4CL 12 from muonic atom (1970Hi03)
186W  CL           g-factor=0.308 17 FROM g-factor/g-factor(184W, 111)=1.07 5
186W 2CL (1991ST04) IF g-factor(184W, 111)= 0.289 7.  Others: 0.350 35
186W 3CL (1967Gi02), 0.35 3 (1967Ku07).
186W  CL           Q/Q(2+ 182W)=0.908 24 (1969Ch23), 0.906 18 (1971Ob02).
186W  CL T         from BE2. Other values: 1.12 NS 7 (P,P'G) (1959Bi10); 1.01 NS 4
186W 2CL (A,A'G) (1962Bi05); 1.30 NS 21 (1967As03), 1.116 NS 21 pulsed beam
186W 3CL (1967Ku07); 1.38 NS 12 (1970Me09, MOSSBAUER); 1.39 NS 12 (1971Ob02,
186W 4CL MOSSBAUER); GE 1.15 NS 6 (1972Hi14, MOSSBAUER).
186W  CL           Static matrix element <2+ M(E2) 2+> =-2.19 +28-11 (1989Ku04).
186W   G 122.5                  E2                                          K
186W   L 396.7     12 4+                  36.4 PS 25                         A
186W B L BE2=1.63 11 (1971MI08)$BE4=0.14 +15-10$
186W  CL           Static matrix element <4+ M(E2) 4+> =-2.89 +37-14 (1989Ku04).
186W  CL BE2       for 2+(123) to 4+(397) excitation. Other: 2.7 4 (1989Ku04).
186W  CL BE4       from <0+ M(E4) 4+> =-0.37 17, weighted average of -0.27 10
186W 2CL (1974Le16) and -0.64 16 (1974Br31). Other <0+ M(E4) 4+>: -0.25 25
186W 3CL (1975Le22).
186W  CL J         E2 G to 2+; J=0 inconsistent with measured T.
186W  CL           g-factor/g-factor(122, 2+)=1.04 7 (1985St07).
186W  CL           Other T: 38 PS 3 from nuclear deorientation for ions
186W 2CL recoiling in vacuum (1986Bi13).
186W   G 274.2                  E2                                          J
186W   L 737.2      7 2+               4.78 PS   16                         B
186W B L BE2=0.140 4
186W  CL BE2       Weighted average of 0.146 8 (1977Mc11; supersedes 0.150 8
186W 2CL from 1971Mi08) and 0.139 4 (1974Ba81).
186W  CL           g-factor/g-factor(122, 2+)=0.63 13 (1985St07).
186W   G 615            94    3  M1+E2      -11  -4+3
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```
186W  CG MR        from 1971Mi08; A2=-0.140 15 (1971Mi08).
186W   G 737            100      E2
186W   L 810.1     16 6+                   4.0 PS 3                        A
186W B L BE2=1.70 12
186W F L FLAG=N
186W  CL           Static matrix element <6+ M(E2) 6+> =-3.25 +17-42 (1989Ku04).
186W  CL BE2       Weighted average of 1.89 29 (1971Mi08) and 1.66 13
186W 2CL (1979Hu01); for 4+(397) to 6+(810) excitation. Other: 1.21 +14-12
186W 3CL (1989Ku04).
186W  CL           g-factor/g-factor(122, 2+)=1.03 20 (1985St07).
186W   G 413.4                  E2                                         K
186W   L 861.8      9 (3)+                                                 B
186W  CL J         E1 G from 3-; band structure.
186W   G 739
186W   L 884         (0+)                                                  C
186W F L FLAG=L
186W  CL J         from Adopted Levels.
186W   L 952.1     10  (2)-                                               D
186W  CL J         anisotropies of G to 2+ and G from 3-.
186W   G 215                    E1                                         M
186W  CG M         G(|q) corrected for contamination by 184W line (1977Mc11).
186W   L 1006.7    15  4+                                                 B
186W  CL BE2       1977Mc11 report BE2=0.0030 6 for 0+(GS) to 2+(1007)
186W 2CL excitation, based on 610G yield and the assumption that the 1007
186W 3CL level is the 2+ member of the |b band; however level is currently
186W 4CL designated as the J=4 member of the |g band.
186W  CL J         1989Ku04 observe the gammas known to deexcite this level, and
186W 2CL designate them as transitions from the 4+ member of the |g band
186W 3CL rather than from the 2+ member of the |b band (as supposed in
186W 4CL 1977Mc11). The J=4 assignment is consistent with expected strong
```

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186W 5CL excitation of |g band levels in 1989Ku04 and with band systematics in
186W 6CL nearby ^W and Os even-^A nuclei.
186W   G 269
186W  CG E          rounded-off value from Adopted Gammas; |g not evident in
186W 2CG spectrum shown in 1989Ku04 (possibly masked by intense 274G), but
186W 3CG authors imply that it was observed.
186W   G 610           100
186W   G 884         5  12    LT                                          L
186W  CG RI         from |g yields in 1977Mc11 (G not observed).
186W 2CG However, |g is prominent in spectrum in 1989Ku04.
186W   L 1030          2+                                                 C
186W F L FLAG=L
186W  CL J          from Adopted Levels.
186W   L 1045.0      7  3-                                               D
186W S L BE3=0.101 8
186W  CL BE3        From 1977Mc11 (based on yields of 308G, 183G and 215G).
186W   G 93                     M1+E2      1.3   5                      M
186W  CG            |d{+2}=1.8 +150-11 (1977Mc11), from analysis of
186W 2CG 0+(E3)3-(M1+E2 93G)2-(E1 215G)2+ sequence.
186W   G 183            33.5    E1                                       M
186W  CG RI         from G yield (relative to 308G) in 1977Mc11.
186W  CG            Anisotropy=1.29 6 (1977Mc11); consistent with 0+(E3)3-(E1)3+
186W 2CG sequence.
186W   G 308           100      E1                                       M
186W  CG            Anisotropy=0.761 14 (1977Mc11); consistent with
186W 2CG 0+(E3)3-(E1)2+ sequence.
186W   G 1045                   [E3]                                       S
186W  CG M          1045 level directly populated by E3 COULOMB excitation
186W 2CG (1977Mc11).
```

^{170}Er(pol t,α)

```
169HO    170ER(POL T,A)                    1979LO02
169HO  H TYP=FUL$AUT=C. M. BAGLIN$CUT=1-Mar-2008$
169HO C  E(T)=17 MEV, polarization=0.78 (average value); metallic ER
169HO2C  targets enriched to 96.9% in 170ER; measured E(level) (Q3D
169HO3C  mag spect, FWHM AP 16 KEV), angular distributions (9 angles
169HO4C  from 10 DEG to 50 DEG), analyzing powers; interpreted levels
169HO5C  in terms of the NILSSON model, including pairing and CORIOLIS
169HO6C  coupling, aided by analogies with known levels in 165HO
169HO7C  and 167HO.
169HO CL J         From angular distributions and analyzing powers (authors'
169HO2CL values).
169HO CL L         From DWBA analysis of angular distributions.
169HO CL S         NUCLEAR STRUCTURE FACTOR CALCULATED FROM
169HO2CL DS/DW(exp)/(2N DS/DW(DWBA)) ASSUMING ^N=32.5.
169HO CL BAND(A)   7/2[523] band.
169HO CL BAND(B)   3/2[411] band.
169HO CL BAND(C)   1/2[411] band.
-------
169HO  L 0.0          7/2-                              3        0.054       A
169HO  L 97        4  9/2-                              5        0.19        A
169HO  L 215       4  11/2-                             5        1.90        A
169HO CL S         large value attributed to CORIOLIS MIXING WITH OTHER orbitals
169HO2CL FROM the h{-11/2} shell.
169HO  L 254       4  3/2+                              2        0.11        B
169HO  L 314       4  5/2+                              2        0.79        B
169HO  L 359       4  3/2+                              2        0.27        C
169HO  L 381       4  7/2+                              4        0.15      APB
169HO CL L         angular distribution not shown, but L=4 determination
```

169HO2CL implied in text.

^{58}Fe(d,p), (pol d,p)

```
59FE     58FE(D,P), (POL D,P)          1964SP03,1972MC18,1980TA05
59FE  H TYP=FUL$AUT=CORAL M. BAGLIN$CIT=NDS 95,215 (2002)$CUT=8-Feb-2002$
59FE C  Others: 1968GR18, 1967KL03, 1964BJ01.
59FE C  1980TA05: E(POL D)=10 MEV, measured SIGMA(THETA) and analyzing
59FE2C  power, 12 angles from 25 DEG to 80 DEG (lab), enriched targets
59FE3C  (82.48%), 8 SI(LI)-detectors at 15 DEG intervals, FWHM=30-50 KEV for
59FE4C  15-MEV protons, |s(|q) and analyzing power compared with DWBA
59FE5C  calculations.
59FE C  1972MC18: E(D)=10 MEV and 12 MEV, measured SIGMA(THETA), THETA(c.m)
59FE2C  from AP 5 DEG to AP 90 DEG, enriched targets (85.4%), multigap
59FE3C  spectrograph, FWHM=16 KEV for 16-MEV protons.
59FE C  1968GR18: E(D)=6 MEV. DWBA analysis of SIGMA(THETA); levels at 730,
59FE2C  1020, 1230, 1910 and 3590; deduced (2JF+1)^S for each level.
59FE C  1967KL03: E(D)=10 MEV, measured SIGMA(THETA), 34 angles from 7.5 DEG to
59FE2C  165 DEG, surface-barrier detector for protons at 25 DEG to 165 DEG with
59FE3C  FWHM (GS)=44 KEV, magnetic spectrograph at 5 angles from 7.5 DEG to
59FE4C  35 DEG.
59FE C  1964SP03: E(D)=6.55 MEV, THETA=30 DEG and 45 DEG; for E(D)=7.0 MEV,
59FE2C  THETA=10 DEG. Measured EP, enriched target (75.1%), single-gap
59FE3C  spectrograph.
59FE C  1964BJ01: E(D)=3-4.3 MEV, THETA=145.5 DEG, levels at 0, 290, 477,
59FE2C  614, 639, 732 KEV, DE=8 KEV.
59FE C  Spectroscopic factors from 1967KL03 are in very poor agreement with
59FE2C  those from 1972MC18 and 1980TA05. The results of 1980TA05 and 1968GR18
59FE3C  are in fair agreement with 1972MC18.
59FE CL L,S       L values and spectroscopic factors are from 1972MC18, based
```

```
59FE2CL on comparison of 10 MEV data with DWBA calculations, except as noted.
59FE CL E          From 1964SP03, except as noted.
59FE CL J          From L value and measured analyzing power (1980TA05).
59FE CL S$LABEL=S'
59FE CL E(A),S(A) From 1972MC18. Value of ^S' shown assumes L=1.
59FE CL L(B),S(B)$From 1980TA05.
59FE CL E(D)       Doublet.
59FE CL E(E)       From 1964BJ01.
59FE CL J(F),L(F)$Weakly excited state; |s(|q) corrected for JPI=3/2- 58FE
59FE2CL contaminant nearby. Analyzing power compatible with 3/2- or 5/2-.
59FE3CL |s(|q) poorly fitted by L=1 or L=3 DWBA in 1980TA05, and deviates
59FE4CL significantly from |s(|q) for other levels at |q>60 DEG. Consequently,
59FE5CL evaluator considers authors' L=1 assignment to be uncertain; it also
59FE6CL conflicts with adopted JPI(574)=5/2-.
59FE  L 0                   3/2-                    1        1.45
59FE  L 287        10       1/2-                    1        0.09
59FE  L 473        10       5/2-                    3        2.10
59FE  L 574               (3/2-,5/2-)               (1,3)    0.017       A
59FE3 L FLAG=F
59FE  L 614        8                                                     E  ?
59FE  L 639        8                                                     E  ?
59FE  L 728        10       3/2-                    1        0.50
59FE  L 1026       10       (7/2)-                  3        0.19
```

^{58}Fe(d,pγ)

Separated from (d,p) data set because γ rays observed here

```
59FE    58FE(D,PG)                    1977PA18
59FE  H TYP=FUL$AUT=CORAL M. BAGLIN$CIT=NDS 95,215 (2002)$CUT=8-Feb-2002$
59FE C  E(D)=3.5 MEV. Measured EG, natural and enriched (83.5%) targets, GELI
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```
59FE2C  (1977PA18).
59FE CL E          From EG.
59FE  L 0
59FE  L 287.3      10
59FE  G  287.3     10
59FE  L 472        3
59FE  G  472       3
59FE  L 570.9      10
59FE  G  570.9     10
```

No need to give source of E_γ data because only one keynumber.

^{59}Co(n,p)

```
59FE     59CO(N,P)                        1993AL21,1963MO13
59FE  H TYP=FUL$AUT=CORAL M. BAGLIN$CIT=NDS 95,215 (2002)$CUT=8-Feb-2002$
59FE C  1993AL21: EN=198 MEV, |q(lab)=0 DEG-20 DEG (4 DEG steps), 99.99% 59CO
59FE2C  targets, magnetic spectrometer, FWHM AP 900 KEV; measured energy
59FE3C  spectra at 6 angles for protons exciting levels with E<30 MEV; ^DWIA
59FE4C  analysis. Decomposed strength function into L=0,1,2,3 components;
59FE5C  ^GT resonance (L=0) observed with centroid at 4.1 MEV. See 2001LA12
59FE6C  and 1999CA29 for further discussion of these results.
59FE C  1963MO13: measured energy and angular distribution of protons emitted
59FE2C  from 59CO when bombarded by 14.8-MEV 3H(D,N) neutrons.
```

Note: no data from this data set will be used in Adopted Levels, Gammas, but this reaction must still be assigned an XREF there

^{165}Ho(n,γ) E=thermal

```
166HO    165HO(N,G) E=THERMAL          1967MO05,1984KE15,2000PR03
166HO  H TYP=FUL$AUT=C. M. BAGLIN$CIT=NDS 109, 1103 (2008)$
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166HO2 H CUT=1-Mar-2008$
166HO C  Other measurements: 1958SK59, 1959DR75, 1959JO33, 1960AL27, 1961ES02,
166HO2C  1961KR01, 1963GI03, 1963OR02, 1973HE15, 1973PRZI,
166HO3C  1979BO08, 1988BA79, 1989DU03, 2003CHZS, 2007CHZX.
166HO C  INCLUDES (POL N,G) E=0.065 EV.
166HO C  JPI(TARGET)=7/2-.
166HO C  SIGMAN=61.2 11 (2006MUZX).  ABUNDANCE(165HO)=100%.
166HO C  2007CHZX: PROVIDES AN EVALUATION OF EXPERIMENTAL DATA INCLUDING NEW
166HO2C  EG AND ELEMENTAL CROSS SECTION MEASUREMENTS USING GELI DETECTOR FOR
166HO3C  148 PRIMARY AND 73 SECONDARY TRANSITIONS (HEREIN REFERRED TO AS
166HO4C  'Budapest data', and taken from the ^EGAF SECTION OF THE ^CD THAT IS
166HO5C  PART OF THIS PUBLICATION).  SUPERSEDES 2003CHZS.
166HO C  2000PR03: THREE-CRYSTAL PAIR SPECTROMETER, FWHM AP 5.5 KEV AT 6.5 MEV;
166HO2C  calibration based on SN AND PATTERN OF PRIMARY TRANSITIONS TO SEVERAL
166HO3C  WELL-ESTABLISHED LOW-LYING LEVELS; MEASURED EG, GG COIN; DEDUCED
166HO4C  BAND STRUCTURE.
166HO C  1984KE15: >99.9% HO TARGET; Ge DETECTOR INSIDE QUADRISECTED NaI(Tl)
166HO2C  ANNULUS (FWHM=3.1-4.5 KEV FOR EG=4000-6200); MEASURED EG, IG FOR 270
166HO3C  TRANSITIONS WITH EG>4050; 14N(N,G) REACTION USED FOR CALIBRATION.
166HO C  1979BO08: (POL N,G); POLARIZED E=0.065 EV NEUTRONS AND POLARIZED
166HO2C  SINGLE-CRYSTAL 165HO TARGET; MEASURED G(|q) FOR 15 PRIMARY GAMMAS;
166HO3C  DEDUCED J.
166HO C  1967MO05: 99.8% HO TARGET; MEASURED PRIMARY EG, IG USING GELI DETECTOR
166HO2C  AS TWO-ESCAPE PAIR SPECTROMETER (FWHM=8.0 KEV; EG=5000-6200); MEASURED
166HO3C  SECONDARY EG, IG USING Riso CURVED-CRYSTAL SPECTROMETER (EG=30-750) OR
166HO4C  IG USING GELI DETECTOR (EG=70-550); MEASURED CONVERSION ELECTRONS
166HO5C  (E=29-500) USING Elephant SPECTROMETER AT Munich (FWHM=0.6% AT 100 KEV,
166HO6C  0.3% AT 200 KEV; THICK SOURCE) AND THE Studsvik B- SPECTROMETER
166HO7C  (FWHM=0.2%; THIN SOURCE).
166HO C  The LEVEL SCHEME INCLUDES REFINEMENTS MADE BY 2000PR03 TO THE SCHEMES
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166HO2C  PROPOSED BY 1967MO05 AND OTHERS, IN WHICH G placements were based on
166HO3C  THE RITZ PRINCIPLE (SOMEWHAT UNRELIABLE AT THIS LEVEL DENSITY); GG
166HO4C  COIN DATA FROM 2000PR03 LED TO THE PLACEMENT OR RELOCATION OF MANY
166HO5C  TRANSITIONS AND THE ELUCIDATION OF A NUMBER OF ADDITIONAL BANDS.
166HO CG E,RI       EG data are from 1984KE15 if E>4050, and E<4050 data are from
166HO2CG 1967MO05 (cryst.), EXCEPT AS NOTED. 1967MO05 also report two separate
166HO3CG GE(LI) detector measurements of EG and/or IG for a number of G rays.
166HO4CG EG DATA FROM 2007CHZX (Budapest DATA) ARE, IN GENERAL, LESS PRECISE
166HO5CG AND LESS EXTENSIVE, BUT IN reasonable AGREEMENT WITH THE CRYSTAL DATA;
166HO6CG IG DATA SHOW POOR TO FAIR AGREEMENT WITH THE CRYSTAL DATA. THE
166HO7CG EVALUATOR GIVES THE LATTER EG, IG DATA IN COMMENTS; THE POSSIBLE
166HO8CG EXISTENCE OF COMPLEX LINES (DUE TO POORER RESOLUTION OR PRESENCE OF
166HO9CG IMPURITIES) MAKES IT DIFFICULT TO COMBINE THESE DATA WITH THE CRYSTAL
166HOACG DATA. The EG DATA of 1967MO05 are from wavelength
166HOCCG measurements and probably need to be increased by about 9 ppm to
166HODCG correspond to a scale on which EG(198AU)=411.80205 17. ALSO, the
166HOECG uncertainties do not include an uncertainty of 0.3 ppm in the
166HOFCG conversion of wavelength to energy (SEE, e.g., 2000HE14).
166HO CG M          From CONVERSION ELECTRON DATA (1967MO05,1973PRZI), EXCEPT
166HO2CG AS NOTED. THE PHOTON AND ELECTRON INTENSITY SCALES WERE NORMALIZED
166HO3CG BY 1967MO05 ASSUMING KC(116G)=1.46, L1C(116)=0.18 (FROM M1 theory)
166HO4CG AND KC(137G)=0.117 (FROM E1 THEORY); CURRENT THEORETICAL VALUES ARE
166HO5CG 3.7% LOWER, 1.3% LOWER AND 5.4% HIGHER, RESPECTIVELY, BUT IN VIEW OF
166HO6CG THE RELATIVELY MUCH LARGER UNCERTAINTIES IN THE EXPERIMENTAL DATA, THE
166HO7CG EVALUATOR HAS CHOSEN NOT TO RENORMALIZE THOSE AUTHORS' VALUES.
166HO CG E(A)       Questionable transition.
166HO CG E(B)       Line is complex (1967MO05).
166HO CG E(D)       From 1989DU03 (SI(LI)).
166HO CG RI(D)      From 1989DU03; a calibration uncertainty of 6% has been
166HO2CG ADDED IN QUADRATURE WITH THE STATISTICAL UNCERTAINTY.
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```
166HO CG E(E)       EG DEVIATES FROM LEAST-SQUARES PREDICTION BY AT LEAST 5|s.
166HO CG E(P)       PLACEMENT FROM 2000PR03.
166HO CL E          FROM LEAST-SQUARES FIT TO EG, EXCLUDING DATA FOR MULTIPLY
166HO2CL PLACED TRANSITIONS AND FOR THE 48.303G AND 232.286G, BOTH OF WHICH
166HO3CL FIT THEIR PLACEMENTS PARTICULARLY POORLY. HOWEVER, IT SHOULD BE NOTED
166HO4CL THAT 28 OF THE REMAINING 570 EG DATA DEVIATE BY AT LEAST 3|s FROM
166HO5CL THE LEAST-SQUARES PREDICTION AND, OF THOSE, 12 DEVIATE BY AT LEAST 5|s.
166HO6CL THE LATTER ARE NOTED IN COMMENTS ON THE RELEVANT G.
166HO CL J          RECOMMENDED VALUE FROM 2000PR03, unless otherwise noted;
166HO2CL BASED ON TRANSITION MULTIPOLARITY AND DEDUCED BAND STRUCTURE.
166HO CL T(h)       From 1978SC10.
166HO CL J(u)       Spin from the angular distribution measurements of the
166HO2CL primary G FEEDING LEVEL (1979BO08).
166HO CL E(P)       FROM LEAST-SQUARES FIT TO EG (cf. SN=6243.64 2 IN 2003AU03).
166HO CL J(Q)       S-WAVE capture on JPI=7/2- target.
166HO CL BAND(A)    KPI=0-, (|p 7/2[523])-(|n 7/2[633]) BAND.
166HO CL BAND(B)    KPI=7-, (|p 7/2[523])+(|n 7/2[633]) BAND.
166HO CL BAND(C)    KPI=3+, (|p 7/2[523])-(|n 1/2[521]) BAND.
166HO CL BAND(D)    KPI=5+ BAND.
166HO2CL CONFIGURATION: (|p 3/2[411]+|n 7/2[633])+(|p 7/2[523]+|n 3/2[521]).
166HO CL BAND(E)    KPI=6+, (|p 7/2[523])+(|n 5/2[512]) BAND.
166HO CL BAND(F)    KPI=4+, (|p 7/2[523])+(|n 1/2[521]) BAND.
166HO CL BAND(G)    KPI=1-, (|p 1/2[411])+(|n 1/2[521]) BAND.
166HO CL BAND(H)    KPI=1+, (|p 7/2[523])-(|n 5/2[523]) BAND.
166HO CL BAND(I)    KPI=2-, (|p 7/2[523])-(|n 7/2[633])+Q{-22} BAND.
166HO CL BAND(J)    KPI=2+ BAND.
166HO2CL CONFIGURATION: (|p 3/2[411]-|n 7/2[633])+(|p 7/2[523]-|n 3/2[521]).
-------------
166HO CL BAND(W)    KPI=2-, (|p 3/2[411])+(|n 1/2[521]) BAND.
166HO CL BAND(X)    KPI=5-, (|p 7/2[523])+(|n 7/2[633])-Q{-22} BAND.
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166HO CL BAND(Y)   KPI=0-, (|p 1/2[411])-(|n 1/2[521]) BAND.
166HO CL BAND(Z)   KPI=3- BAND.
166HO2CL CONFIGURATION (|p 1/2[541])-(|n 7/2[633]) OR
166HO3CL (|p 1/2[411])+(|n 5/2[512]).
166HO CL BAND(1)   KPI=6+, (|p 7/2[523])+(|n 5/2[523]) BAND.
166HO CL BAND(2)   KPI=2+, (|p 7/2[523])-(|n 3/2[521]) BAND.
166HO CL BAND(3)   KPI=5+, (|p 7/2[523])+(|n 3/2[521]) BAND.
166HO CL J(5)      FROM Adopted Levels.
166HO CL T(6)      FROM Adopted Levels.
166HO CL J(7)      2 OR POSSIBLY 4 FROM 5812G(|q), NOT 4 FROM 5812G CIRCULAR
166HO2CL POLARIZATION (1979BO08).
166HO CL J(8)      J=3,4 FROM 5761G(|q) (1979BO08).
166HO CL J(9)      4 OR POSSIBLY 3 FROM 5523G(|q) (1979BO08).
166HO  N 1.0          1.0
166HO CN NR        FROM 1967MO05.  If, instead, one obtained NR by requiring
166HO2CN that SUMOF (TI to GS)=100, a value of 1.02 9 would be obtained, in
166HO3CN excellent agreement with the normalization recommended by 1967MO05.
166HO4CN THE RATIO ^R=IG(2007CHZX, 'Budapest DATA')/RI(1967MO05) VARIES WIDELY
166HO5CN BUT, IF CASES WHERE THE INTENSITIES DIFFER BY AT LEAST A FACTOR OF 3
166HO6CN ARE REMOVED FROM CONSIDERATION, THE AVERAGE VALUE OF ^R IS 0.93 FOR
166HO7CN SECONDARY LINES AND 1.10 FOR PRIMARY TRANSITIONS.  Some, but not all,
166HO8CN of the INCONSISTENCIES MAY STEM FROM THE POORER ENERGY RESOLUTION OF
166HO9CN THE 2007CHZX MEASUREMENT OR FROM THE PRESENCE OF UNIDENTIFIED
166HOACN IMPURITIES. For the strong 116.8G, 136.7G, 5181G, 5212G AND 5813G,
166HOBCN RI(2007CHZX)/RI(1967MO05) IS 0.83 9, 0.85 10, 0.95 9, 1.04 11 AND
166HOCCN 0.93 8, RESPECTIVELY.  WITH THE ADOPTED NORMALIZATION, THE TOTAL
166HODCN OBSERVED PRIMARY G INTENSITY IS 16%.
166HO PN                                                                C
166HO2PN IG PER 100 THERMAL NEUTRON CAPTURES IN 165HO.
166HO  G 37.42     4 0.014   3                                          D
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166HO CG            PLACEMENT FROM 605 AND 672 LEVELS REJECTED IN 2000PR03.
166HO  G 57.469     100.07
166HO CG            PLACEMENT FROM 725 LEVEL REJECTED IN 2000PR03.
166HO  G 57.83      2 0.02                                                A
166HO  G 78.871     120.05
------------
166HO  G 715.3      6 0.60    18
166HO  G 734.4      100.3
166HO CG            PLACEMENT FROM 925 LEVEL REJECTED IN 2000PR03.
166HO CG            OTHER: EG=734.45 6, IG=0.41 3 ('Budapest data', 2007CHZX).
166HO  L 0.0          0-                26.824 H  12                        A
166HOF L FLAG=56
166HO  L 5.969      12 7-               1.20E3 Y  18                        BM
166HOF L FLAG=6
166HO  L 54.2391     7 2-                                                 A
166HO  G 54.2392    7 2.50    25E2                      31.3                C
166HO CG M          from L12:L3:M:N=20:20:14:2 (1973PRZI);
166HO2CG EL12C=7.8 31, EL3C=7.8 31, EMC=5.9 29, ENC=0.8 5 (1973PRZI).
166HO3CG EL3C=14 5, L2:L3:M:N=125 38:138 41:54 16:16 5 (1967MO05).
166HO  L 82.4707    20 1-                                                 A
166HO  G 28.242     9 0.040   3 M1                      16.99               D
166HO CG M          from Adopted Gammas.
166HO  G 82.470     2 0.97    10M1                      4.55                C
166HO CG M          from EL1C=1.0 5 (1973PRZI); EKC=2.8 14, EL1C=0.5 3
166HO2CG (1967MO05).
166HO CG            OTHER: EG=82.49 5, IG=0.68 5 ('Budapest data', 2007CHZX).
166HO  L 137.729    13 8-                                                 B
166HO  G 131.759    5 0.140   21
166HO  L 171.0738   12 3-                                                 A
166HO  G 88.60      3  0.03      [E2]                   4.466
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166HO  G 116.835   1  15.8   16 M1                      1.673                C
166HO CG           K:L1:M:N=100 15:15 2:4.7 14:1.6 5 (1967MO05);
166HO2CG K:L1:L2:L3=100 15:13 2:1.7 5:<0.9 (1967MO05, thin source);
166HO3CG K:L12:M:N=24:5:2:<1 (1973PRZI).
166HO4CG EKC=1.5 4, EL12C=0.29 15, EMC=0.13 6, ENC<0.06 (1973PRZI).
166HO DG E         116.833 10 (1963OR02)
166HO CG           OTHER: EG=116.84 4, IG=13.0 6 ('Budapest data', 2007CHZX).
166HO  L 180.467    3 4-                                                  A
166HO  G 9.393                                              12.3      10   S
166HO CG E         FROM LEVEL ENERGY DIFFERENCE; transition expected but
166HO2CG not observed (see 1978BA78).
166HO CG TI        FROM TI IMBALANCE AT 180 LEVEL.
166HO  G 126.228   3 1.06    11E2                      1.200                C
166HO CG           K:L2:L3=100 30:29 14:29 14; EKC=0.74 24 (1967MO05).
166HO CG           OTHER: EG=126.21 5, IG=0.89 6 ('Budapest data', 2007CHZX).
166HO  L 190.9021  20 3+                                                 C
166HOF L FLAG=u
166HO  G 10.43     2 0.052    9[E1]                     27.2                 D
166HO  G 19.840    6 1.09     9 E1                      4.79                 D
166HO CG M         from Adopted Gammas.
166HO  G 136.662   2 27.5    28E1                       0.1378               C
166HO CG           K:L12:M:N=4:1:<1:<1 (1973PRZI); K:L12=9.8 12:1.1 2
166HO2CG (1967MO05); EKC=0.16 6, EL12C=0.039 23 (1973PRZI).
166HO DG E         136.653 14 (1963OR02); 136.665 8 (1965CS09 CRYST).
166HO CG           OTHER: EG=136.67 4, IG=23.3 11 ('Budapest data', 2007CHZX).
166HO  L 260.6625  23 4+                0.5 NS    LE                     C
166HOF L FLAG=hu
166HO  G 69.7604   14 2.8    3 M1                       7.37                 C
166HO CG           L12:M:N=5:<1:<1 (1973PRZI);
166HO2CG EL12C=1.9 10 (1973PRZI); EL1C=0.47 20 from 1967MO05 and
```

```
166HO3CG 0.80 15 quoted by 1967MO05 from other work.
166HO DG E         69.736 40 (1963OR02 CRYST); 69.769 7 (1965SC09 CRYST).
166HO CG           OTHER: EG=69.79 4, IG=1.76 10 ('Budapest data', 2007CHZX).
166HO  G 89.599    13 0.100  15[E1]                    0.424                C
166HO  L 263.7876  24 5+               0.5 NS     LE                       D
166HOF L FLAG=h
166HO  G 3.1                                                   4.1       7    S
166HO CG E         FROM LEVEL ENERGY DIFFERENCE; transition expected but
166HO2CG not observed (see 1978BA78).
166HO CG TI        FROM TI IMBALANCE AT 264 LEVEL.
166HO  G 72.8859   150.20    4 E2                     9.62
166HO CG M         from
166HO2CG EL2C=2.8 15, EL3C=4.5 24 (1967MO05) one obtains mult=E2(+M1),
166HO3CG MR>1.6. The level scheme requires DJ=2. E1+M2 would require
166HO4CG MR>1.2 and thus is excluded by RUL.
166HO CG           OTHER: EG=72.89 7, IG=0.27 5 ('Budapest data', 2007CHZX).
166HO  G 257.81    2 0.26    4 M2                     0.844
166HO3 G EKC=0.5 3 (1967MO05)
166HO CG           OTHER: EG=257.54 12, IG=0.29 6 ('Budapest data', 2007CHZX).
-----------
166HO  L 377.806    4 6-                                                   A
166HO  G 48.0315   7 0.17    3
166HO  G 197.339   8 0.32    5 (E2)                   0.255                C
166HO3 G EKC=0.26 17 (1967MO05)
166HO CG           OTHER: EG=197.58 5, IG=0.55 5 ('Budapest data', 2007CHZX);
166HO2CG PROBABLY A 197.7G+197.3G+197.1G UNRESOLVED MULTIPLET.
166HO  L 379.547    4 6+                                                   D
166HO  G 84.468    100.13    3                                             P
166HO CG           OTHER EG: 84.68 7, IG=0.229 26 ('Budapest data', 2007CHZX);
166HO2CG POSSIBLY FOR UNRESOLVED DOUBLET.
```

```
166HO CG            PLACEMENT FROM 348 LEVEL REJECTED IN 2000PR03.
166HO  G 115.759    3 0.34    5                                          P
166HO  G 373.47     7 0.45    7                                          P
166HO  L 416.086     6 2-                0.2 NS    LE                     V
166HOF L FLAG=h
-----------------
166HO  L 2180.0     3
166HO  L 2182.92    22
166HO  L 2193.20    15
166HO  L 6243.714    8 3-,4-                                             S
166HOF L FLAG=PQ
166HO  G 4050.46    150.097   6
166HO CG            OTHER: EG=4049.4 5, IG=0.193 23 ('Budapest data', 2007CHZX).
166HO  G 4060.74    220.037   3
166HO  G 4063.66    250.029   3
---------
166HO  G 6052.66    3 0.374   20
166HO CG            OTHER: EG=6052.31 22 IG=0.30 3 ('Budapest data', 2007CHZX).
166HO  G 6063.21    160.014   1
166HO  G 6072.46    4 0.063   3
166HO CG            OTHER: EG=6072.7 4, IG=0.047 13 ('Budapest data', 2007CHZX).
166HO  G 6189.33    190.006   1
```

^{169}Tm(n,γ) E=thermal: two-photon cascades

```
170TM    169TM(N,G) E=THERMAL: G COIN  1996VA23,1996HO12
170TM  H TYP=FUL$AUT=CORAL M. BAGLIN$CIT=NDS 96,611 (2002)$CUT=15-Aug-2002$
170TM C  Others: 2001VA11 (level density and strength function deductions from
170TM2C  two-photon cascade data), 1999BO14.
170TM C  This dataset contains (N,G) E=thermal data obtained from measurements
```

```
170TM2C  of two-photon cascades only; for all other (N,G) E=thermal data,
170TM3C  please see the (N,G) E=0-136 EV dataset.
170TM C  1996VA23: EN=thermal; GELI and HPGe detectors, FWHM=3-4 KEV at E=1332,
170TM2C  time resolution 10-12 NS; measured EG, (high-energy G)-(low-energy G)
170TM3C  coin, I(GG coin) for two-photon cascades from capture state.
170TM C  1996VA23 and 1996HO12 have several authors in common and report on
170TM2C  the same two-photon cascade experiment. Apparently 1996HO12 present
170TM3C  only a subset of the data reported in 1996VA23; however, both EG and
170TM4C  IG data differ slightly from one paper to the other. The order in
170TM5C  which these papers were submitted for publication is unclear, so the
170TM6C  evaluator has chosen to present the data from the much more extensive
170TM7C  listing in 1996VA23. The differences between the two sets of data
170TM8C  are almost never of statistical significance.
170TM CG RI        1996VA23 report (high-energy G)-(low-energy G) coincidence
170TM2CG photon intensities, normalized so the area of the experimental
170TM3CG distribution in the interval 520<EG<(E(cascade)-520) is 100% for each
170TM4CG two-photon energy-sum gated spectrum. Data were reported for 14 strong
170TM5CG energy sums, corresponding to two-photon cascades terminating at
170TM6CG the GS and the 39, 115, 150, 183, 204, 220, 237, 271, 350, 447, 590,
170TM7CG 604 and 638?+649+650 levels. For completeness, these sum spectrum
170TM8CG intensities are shown here under the label I{-|g1|g2} opposite
170TM9CG the relevant G{-2} energy. Note that, due to experimental conditions,
170TMACG these intensities are only lower limits if EG<520 for one of the
170TMBCG coincident gammas (1996HO12); this affects a number of transitions
170TMCCG deexciting levels with E LE 760.
170TM CG RI$LABEL=I{-|g1|g2}
170TM CL E         From 1996VA23. In many cases, E(level) values based on a
170TM2CL least-squares adjustment of EG have significantly smaller
170TM3CL and apparently less realistic uncertainties; also, it should be noted
170TM4CL that an extraordinarily large number of EG data differ
```

```
170TM5CL by at least 4|s from the least-squares adjusted values.
170TM CG E         From 1996VA23. EG values for many secondary gammas differ
170TM2CG significantly (GE 4|s) from the least-squares adjusted values; such
170TM3CG cases are noted. The EG values given for the primary gammas are the
170TM4CG average of all values listed in 1996VA23. The authors do not give
170TM5CG uncertainties for these; it should be noted, however, that in the
170TM6CG worst cases, there can be a 6 KEV spread in the values averaged.
170TM7CG Data for unplaced gammas are not included here; please see 1996VA23
170TM8CG for those (AP 80 GAMMA pairs).
170TM CG E(A),RI(A)$From 1996HO12. Not reported in 1996VA23.
170TM CL E(B)      Rounded-off value from Adopted Levels.
170TM CG E(C)      1996VA23 place a 428.6G and a 532.6G from an otherwise
170TM2CG unknown E=647.9 6 level, but 1996HO12 place them from the adopted
170TM3CG 648.75 level which is known to be deexcited by a 429.0G.
170TM CG E(D)      Value differs by at least 4|s from that expected based on
170TM2CG least-squares adjusted level energies.
170TM3CG Possibly the precision of EG data has been overestimated
170TM4CG for some secondary transitions. Almost certainly, some closely-spaced
170TM5CG intermediate or final levels involved in the cascades have not been
170TM6CG resolved; for example, a large number of transitions to E(level) AP 640
170TM7CG KEV may be unresolved doublets comprised of G's feeding the adopted
170TM8CG 648.7 and 637.9 levels.
170TM CL E(E)      Added by evaluator. Although 1996VA23 do not include this
170TM2CL level and the spread of EG(primary) values suggests that only the
170TM3CL 648.6 level is significantly populated by the relevant primary G,
170TM4CL many G's which feed a level in the vicinity of 640 KEV have EG values
170TM5CL intermediate between those expected for transitions to the 648.6 and
170TM6CL 637.9 levels.
170TM CL E(Y)      From SN (1995AU04).
170TM CL J(Z)      L=0 neutron capture by JPI=1/2+ target.
```

```
170TM PN                                                                C6
170TM2PN I{-|g1|g2}
170TM  L 0.0
170TM  L 38.7                                                           B
170TM  L 114.5                                                          B
170TM  L 149.7                                                          B
170TM  L 183.20                                                         B
170TM  L 204.4                                                          B
170TM  L 219.7                                                          B
170TM  L 237.2                                                          B
170TM  L 270.5                                                          B
170TM  L 349.7                                                          B
170TM  L 447.1                                                          B
170TM  L 589.7      6
170TM  G  352.7     2 2.6     4
170TM  G  369.7     4 1.4     3
170TM  G  439.1     3 1.7     4
170TM  G  476.1     4 0.7     2
170TM CG E         presumably the 475G from GG coin in fig. 5 of 1996HO12.
170TM  G  551.4     1 8.0     5
170TM  G  589.7     1 6.8     4
---------
170TM  L 6593.3    11 0+,1+                                                S
170TM3 L FLAG=YZ
170TM  G  6004.1
170TM DG           FL=589.7
```

^{169}Tm(n,γ) E=2, 24 keV

```
170TM    169TM(N,G) E=2, 24 KEV        1996HO12
```

```
170TM  H TYP=FUL$AUT=CORAL M. BAGLIN$CIT=NDS 96,611 (2002)$CUT=15-Aug-2002$
170TM C  Target JPI=1/2+.
170TM C  1996HO12: three-crystal pair spectrometer, FWHM=5.5 KEV at 6.5 MEV;
170TM2C  oxide target; measured EG, IG for average resonance capture primary
170TM3C  transitions; deduced ^S(n)=6591.8 12 (cf. 6593.3 11 in 1995AU04).
170TM4C  Supersedes 1994HOZZ.
170TM CL E          Authors' best values based on both 2-KEV and 24-KEV data,
170TM2CL except as noted. EG data for primary transitions
170TM3CL are based on a chlorine calibration, and DE
170TM4CL ranges between 0.1 KEV and 1.6 KEV for these. E(level) values from
170TM5CL these data deviate by at most 1.2 KEV from adopted values for E<1160.
170TM6CL The evaluator, therefore, assigns DE=1.5 KEV to E(level) values which
170TM7CL have been adopted from this data set. Note that the level indicated
170TM8CL at 1.2 KEV is, in reality, the ground state.
170TM CL J          J LE 2 is expected for all levels fed by primary gammas
170TM2CL in this reaction. PI is based on reduced intensity of primary G
170TM3CL feeding level (PI=+ states are less strongly fed).
170TM CG RI$LABEL=IG/(EG{+5})
170TM CG RI         Reduced photon intensity (i.e., IG/(EG{+5})) for EN=2 KEV.
170TM CG TI$LABEL=IG(2)/IG(24)
170TM CG TI         G intensity for E(n)=2 KEV divided by G intensity for
170TM2CG E(n)=24 KEV.
170TM CG E(A)       Doublet.
170TM CL E(A)       Based on EG for 14 strong primary transitions in the 2-KEV
170TM2CL measurements and the knowledge that the effective neutron energy
170TM3CL would be AP 1.2 KEV (presumably as a result of moderation of the
170TM4CL neutrons in the target assembly), 1996HO12 deduce SN=6591.8 9 (cf.
170TM5CL 6593.1 11 in 1995AU04). The evaluator, therefore, estimates
170TM5CL E=(6591.8+1.2) for the capture state in the 2-KEV measurement and
170TM6CL assigns an uncertainty of 2 KEV. Since the effective neutron energy
```

```
170TM7CL for the 24-KEV measurement is not known, the evaluator estimates
170TM8CL the capture state(s) energy from EG for the primary to the GS and
170TM9CL again assigns an uncertainty of 2 KEV.
170TM CL J(J)      Reduced IG(E(n)=2 KEV) for primary G to this level favors
170TM2CL PI=+, but DRI is unstated.
170TM  N
170TM PN                                                                  C5
170TM2PN REDUCED INTENSITY, IG/EG{+5} FOR EN=2 KEV
170TM  L 1.2        4 (LE 2-)
170TM  L 39.6       1 (LE 2-)
170TM  L 150.0      2 (LE 2-)
170TM  L 203.8      2 (LE 2-)
170TM  L 219.9      2 (LE 2-)
170TM  L 237.3      1 (LE 2-)
170TM  L 589.7      1 (LE 2-)
170TM  L 6593       2                                                      S
170TMF L FLAG=A
170TM CL E         resonance capture state(s) for average n energy of 2 KEV.
170TM  G 6012.4     3                                          0.17      2
170TM  G 6026.8     1                                          0.46      7
170TM  G 6379.2     1                                          0.39      6
170TM  G 6397.1     1                                          0.25      4
```

^{169}Tm(d,p)

```
170TM    169TM(D,P)                    1996HO12,1966SH03,1966RY01
170TM  H TYP=FUL$AUT=CORAL M. BAGLIN$CIT=NDS 96,611 (2002)$CUT=15-Aug-2002$
170TM C  Target JPI=1/2+.
170TM C  1996HO12: E=12, 20, 26 MEV; |q(lab)=20|', 25|', 30|', 40|',
170TM2C  45|'; magnetic spectrograph; measured E(p), d|s/d|W(|q).
```

```
170TM4C  Supersedes 1995HOZZ.
170TM C  1966SH03: E=12 MEV; measured |s(E(p),|q) in 5 DEG steps from
170TM2C  10|' to 45|' and 10|' steps from 45|' to 135|', magnetic
170TM3C  spectrograph with nuclear emulsions, FWHM|?12 KEV; DWBA analysis.
170TM C  1966RY01: E=11, 12 MEV; narrow range magnetic spectrograph,
170TM2C  FWHM AP 18 KEV; measured |s(E(p)), |q=90|' for
170TM3C  11 MEV, |q=90, 60 DEG for 12 MEV.
170TM CL E         From 1996HO12. Other data are given in comment on relevant
170TM2CL level. (For data from 1966SH03, DE for E LE 270 is statistical
170TM2CL uncertainty only, and reasonable DE for E>350 is 1 to 4 KEV. E from
170TM3CL 1966RY01 is quoted relative to E=0 for g.s.)
170TM CL L         From DWBA analysis of |s(|q) (1966SH03).
170TM CL S$LABEL=d|s/d|W(30 DEG)
170TM CL S         d|s/d|W(30|') in |mb/sr for E(d)=20 MeV (1996HO12). See
170TM2CL 1996HO12 for additional cross section data for E(d)=12 MeV (45|'),
170TM3CL E(d)=20 MeV (20|', 40|') and E(d)=26 MeV (25|').
170TM CL BAND(A)   KPI=0- BAND.
170TM2CL Configuration=(|p 1/2[411])-(|n 1/2[521])
170TM CL BAND(B)   KPI=1- GS BAND.
170TM2CL Configuration=(|p 1/2[411])+(|n 1/2[521])
170TM CL BAND(E)   KPI=2- BAND.
170TM2CL Configuration=(|p 1/2[411])-(|n 5/2[512])
170TM CL BAND(J)   KPI=3- BAND.
170TM2CL Configuration=(|p 1/2[411])+(|n 5/2[512])
170TM CL BAND(O)   KPI=1- BAND.
170TM2CL Configuration=(|p 3/2[411]-(|n 5/2[512]) plus (|p 1/2[411])+(|n
170TM3CL 1/2[510]) plus ((|p 1/2[411])-(|n 5/2[512])-|g vibration).
--------------------------
170TM CL BAND(b)   KPI=4+ BAND.
170TM2CL Configuration=(|p 1/2[411])+(|n 7/2[633])
```

Relabel ‘S’ field

```
170TM  L -0.03     18                                    1        112       3 B
170TM CL           Ground state. Other E: 2.5 15 (1966SH03).
170TM  L 38.8       3                                    1        17.1      15B
170TM CL           Other E: 39.5 6 (1966SH03); 38 3 (1966RY01).
170TM  L 114.30    19                                    3        29.9      17B
170TM CL           Other E: 115.0 6 (1966SH03); 115 3 (1966RY01).
170TM  L 149.80     9                                    1        71        3 A
170TM CL           Other E: 149.6 3 (1966SH03); 153 3 (1966RY01).
170TM  L 183.21    15                                    3        27.0      16B
170TM CL           Other E: 183.3 6 (1966SH03); 185 3 (1966RY01).
170TM  L 204.73    21                                             14.0      12E
170TM CL           Other E: 208.2 9 (1966SH03; 45|' spectrum only).
170TM  L 219.68    12                                             29.6      20A
170TM CL           Other E: 218.2 12 (1966SH03); 226 6 (1966RY01).
```

↑ No Jπ ↑ Record L ↑ No S, so give dσ/dω

^{170}Er(^{3}He,t)

```
170TM    170ER(3HE,T)                    1983JA03
170TM  H TYP=FUL$AUT=CORAL M. BAGLIN$CIT=NDS 96,611 (2002)$CUT=15-Aug-2002$
170TM C  E(3HE)=60.5 MEV; magnetic spectrograph, 96.1% 170ER target,
170TM2C  |q(lab)=0|'; measured reaction Q and |G for IAS.
170TM  L 15492      7 0+                104 KEV   8
170TM CL E         from reaction Q of -15825 KEV 6.
170TM CL J         isobaric analog of 170ER G.S.
```

^{92}Mo(d,d'), (pol d,d)

```
92MO     92MO(D,D'), (POL D,D)          1978WA11,1966KI04         NDS00    200101
92MO  H TYP=FUL$AUT=CORAL M. BAGLIN$CIT=NDS 91, 423 (2000)$CUT=7-Nov-2000$
```

```
92MO C  Others: 1987TA15, 1981BI09, 1975BA41.
92MO C  Enriched targets.
92MO C  1966KI04: E(d)=15 MEV; FWHM=40-50 KEV; |q(lab)=40|', 60|'.
92MO C  1975BA41: E(POL D)=15 MEV; measured |s(|q), vector and tensor
92MO2C  analyzing powers for 0,1540,2850 levels; DWBA analysis; deduced |b{-L}.
92MO C  1978WA11: E(d)=21.5 MEV; FWHM|?80 KEV; |q(lab)=20|'-150|'.
92MO C  1981BI09: E(POL D)=12.0 MEV; |q(c.m.)|?30|'-160|';
92MO2C  iT{-11}(|q).
92MO C  1987TA15: E(POL D)=22 MEV; |q(lab)=30|'-170|'; measured vector
92MO2C  and tensor analyzing powers. Elastic scattering only.
92MO CL E         From 1978WA11 if DE specified, from 1966KI04
92MO2CL otherwise.
92MO CL J         From adopted levels.
92MO CL S         |b{-L} from coupled-channels analysis of |s(|q) (1978WA11).
92MO CL S$LABEL=BL
92MO CL E(A)      This peak would mask that for the 0+ 2520 level, if present
92MO2CL (1978WA11).
92MO  L 0            0+
92MO  L 1510      10 2+                                          0.083
92MO  L 2300         4+
92MO  L 2527      10 5-                                                    A
92MO  L 2850      10 3-                                          0.124
```

^{171}Yb(t,α)

```
170TM    171YB(T,A)                    1981DE29
170TM  H TYP=FUL$AUT=CORAL M. BAGLIN$CIT=NDS 96,611 (2002)$CUT=15-Aug-2002$
170TM C  Target JPI=1/2-.
170TM C  E=17 MEV; 88.2% 171YB target, FWHM|?16 KEV, Q3D spectrometer;
```

```
170TM2C  measured EA and |s(|q) in 5|' steps from 15|' to 50|';
170TM3C  DWBA analysis of |s(|q); assigned Nilsson configurations.
170TM CL J         Authors' values, based on |s(|q), and on band
170TM2CL configuration analysis. Note that several of these differ from
170TM3CL values in Adopted Levels.
170TM CL L         Based on comparison of measured |s(|q) with DWBA
170TM2CL calculations (normalization factor=5.5).
170TM CL S$LABEL=d|s/d|W(30 DEG)
170TM CL S         d|s/d|W(30|') in |mb/sr; uncertainties not stated by
170TM2CL authors.
170TM CL BAND(A)   KPI=0- BAND.
170TM2CL Configuration=((|p 1/2[411])-(|n 1/2[521])).
170TM CL BAND(B)   KPI=1- GS BAND.
170TM2CL Configuration=((|p 1/2[411])+(|n 1/2[521])).
170TM CL BAND(C)   KPI=1- BAND.
170TM2CL Configuration=((|p 3/2[411])-(|n 1/2[521])).
170TM CL BAND(E)   KPI=2- BAND.
170TM2CL Configuration=((|p 1/2[411])-(|n 5/2[512])). The authors note that this
170TM3CL configuration can not be excited in (T,A) via a one-step mechanism;
170TM4CL the admixture of configuration=((|p 5/2[413])-(|n 1/2[521])) required
170TM5CL for consistency with experiment is much larger than predicted by
170TM6CL authors' residual interaction mixing calculations.
170TM CL BAND(F)   KPI=2- BAND.
170TM2CL Configuration=((|p 5/2[402])-(|n 1/2[521])).
170TM3CL Level's excitation is stronger than expected for this configuration.
---------------------
170TM CL BAND(J)   KPI=3- BAND.
170TM2CL Configuration=((|p 1/2[411])+(|n 5/2[512])). The authors note that this
170TM3CL configuration can not be excited in (T,A) via a one-step mechanism;
170TM4CL the admixture of configuration=((|p 5/2[413])+(|n 1/2[521])) required
```

```
170TM5CL for consistency with experiment is much larger than predicted by
170TM6CL authors' residual interaction mixing calculations.
-----------------------
170TM CL BAND(Y)   KPI=1- BAND. GAMMA-VIBRATION BUILT ON KPI=1- GS BAND.
170TM  L 0.0          1-                                        6.9         B
170TM  L 40.0      18 2-                                        44.2        B
170TM  L 114.7     18 3-                                        4.6         B
170TM  L 148        4 0-                                        2.2         A
170TM  L 182        3 4-                                        5.1         B
```

^{170}Er(γ,γ'), (γ, pol γ') (resonance fluorescence)

1996Ma18 – Maser *et al.*

TABLE III. Results for the reaction ^{170}Er(γ,γ'). The measured excitation energies E_x, the integrate scattering cross sections I_s, and decay branching ratios R_{expt} are summarized. Ground-state transition width Γ_0, spins J, and K quantum numbers were deduced. Quoted parities are taken from Refs. [10,11]. Th quoted reduced transition probabilities $B(M1)\uparrow$ and $B(E1)\uparrow$, given in the table, were calculated assumin negative parities for $K=0$ levels and positive parities for $K=1$ levels, respectively. For levels which do no exhibit a decay branching to the first 2^+ state reduced transition probabilities are alternatively given for bot parities.

E_x [keV]	I_s [eV b]	Γ_0 [meV]	R_{expt}	K	Spin J^π	$B(M1)\uparrow$ [μ_N^2]	$B(E1)\uparrow$ [10^{-3} e^2 fm^2]
1825	41.7±6.5	31.8±5.5	1.87±0.09	0	1^-	-	14.99±2.59
2133	9.5±1.2	3.8±0.9	-	-	1	0.100±0.025	1.11±0.27
2701	13.4±1.7	12.5±2.5	0.52±0.08	1	1	0.164±0.033	-
2789	38.5±2.2	41.3±3.9	0.64±0.04	(1)	1^+	0.493±0.047	-
2897	6.4±1.3	4.7±1.4	-	-	1	0.050±0.015	0.55±0.16
2930	4.5±0.9	8.4±2.7	1.68±0.39	0	1	-	0.96±0.31
2938	7.6±1.1	9.1±2.6	0.65±0.15	1	1	0.093±0.027	-
3019	17.4±1.4	13.8±3.1	-	-	1	0.130±0.029	1.43±0.32

$\Gamma\gamma_0^2/\Gamma = 0.26\ E_\gamma^2\ I_s / (2J+1)$ meV $\quad \Gamma\gamma_1/\Gamma\gamma_0 = R_{expt}\ (E\gamma_1/E\gamma_0)^3$

$\Gamma = \Gamma\gamma_0^2/\Gamma \times (1+\Gamma\gamma_1/\Gamma\gamma_0)^2$ if $\Gamma=\Gamma\gamma_0+\Gamma\gamma_1$; $\quad T_{1/2}$ (ps) $= 0.4561 / \Gamma$ (meV)

```
170ER    170ER(G,G'), (G,POL G')        1996MA18,1976ME04
170ER  H TYP=FUL$AUT=CORAL M. BAGLIN$CIT=NDS 96,611 (2002)$CUT=15-Aug-2002$
170ER C  Others: 1973ME17, 1991ZI01.
170ER C  1996MA18: bremsstrahlung endpoint energy=3.80 MEV; 96.9% 170ER
170ER2C  oxide target; HPGe detector, 3 Ge detectors, true-coaxial HPGe
170ER3C  COMPTON polarimeter with 8-crystal ^BGO COMPTON shield; |q=95 DEG,
170ER4C  127 DEG; measured EG, integrated cross section, G anisotropy, G
170ER5C  polarization; deduced WIDTH0, |G{-|g0}{+2}/|G, |G{-|g1}/|G{-|g0},
170ER6C  JPI, K.
170ER C  1991ZI01: measured 1824G(|q), |G{-|g0}{+2}/|G; deduced |G{-|g0}.
170ER C  1976ME04: E(e)=1.6-4.2 MEV bremsstrahlung; 96.9% 170ER target;
170ER2C  measured |s(E; EG,|q), |q=98|' and 127|', and G linear polarization.
170ER C  1973ME17: E(e)=1.93 MEV bremsstrahlung; 96.9% 170ER target; measured
170ER2C  E|g', G(|q) (|q=98 DEG and 127 DEG), G linear polarization.
170ER CL           Values of K, deduced by 1996MA18 from measured
170ER2CL |G{-|g1}/|G{-|g0}, are given in comments on the relevant levels.
170ER CL E         From 1996MA18 if DE unstated, from 1976ME04 if DE=2.
170ER CL J         J from G(|q) and PI from G linear polarization, except
170ER2CL as noted; only states having J=1 or 2 can be excited (1976ME04).
170ER CL T         Deduced from |G{-|g0}{+2}/|G and adopted G-ray branching
170ER2CL assuming |G=|G{-|g0}+|G{-|g1}; consequently, these represent upper
170ER3CL limits for any level which has significant branching to states other
170ER4CL than the ground or first excited states.
170ER CL S$LABEL=|G{-|g0}{+2}/|G (meV)
170ER CL S         From 1996MA18, except as noted. Calculated by evaluator
170ER2CL from integrated cross section data of 1996MA18 assuming J indicated,
170ER3CL unless indicated otherwise.
170ER CG RI        Relative branching, based on measured |G{-|g1}/|G{-|g0}.
170ER2CG Calculated by evaluator from R=(|G{-|g1}/|G{-|g0})(E{-|g0}/E{-|g1}){+3}
170ER3CG in 1996MA18, except as noted.
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170ER CG E          From E(level) difference, except for 1824G (from 1991ZI01).
170ER2CG Presumably DE{-|g} LE 2 KEV for transitions from levels given in
170ER3CG 1976ME04 since authors indicate |DE(level)=2 KEV. 1996MA18 do not
170ER4CG state uncertainty, but their level energies are within 1 KEV of
170ER5CG those from 1976ME04 for levels reported in both studies.
170ER CG M          DJ from G anisotropy (1996MA18), except as noted. DPI
170ER2CG from linear polarization (1976ME04).
170ER CG RI(A)      Weak
170ER CL E(A),J(A)$From Adopted Levels.
170ER CL E(B),J(B)$From 1973ME17.
170ER CG RI(B),M(B)$From 1973ME17.
170ER CL T(D)       From weighted average of |G=0.080 EV 7 (from adopted
170ER2CL |G{-|g0}/|G and (|G{-|g0}){+2}/|G=11.6 meV 10 (1973ME17,1996MA18))
170ER3CL and 0.094 EV 7 (from |G{-|g1}/|G{-|g0}=1.64 7 and |G{-|g0}=35.8 meV 24
170ER4CL (1991ZI01)).
170ER PN                                                                    6
170ER  G  3059
170ER CG            (|G{-|g0}){+2}/|G=5 meV (1976ME04) if J=1 to GS transition.
170ER  G  3157
170ER CG            (|G{-|g0}){+2}/|G=14 meV if J=1 to GS transition; however,
170ER2CG this G probably includes a contribution from the 3238 to 79 transition.
170ER  G  3237
170ER CG            (|G{-|g0}){+2}/|G=18 meV if J=1 to GS transition; however,
170ER2CG probable doublet feeding GS and 79 level (1976ME04). Too strong for
170ER3CG known (1996MA18) transition to GS alone.
170ER  G  3317
170ER CG            (|G{-|g0}){+2}/|G=11 meV if J=1 to GS transition; nominated
170ER2CG as a GS transition because a 79 KEV lower EG(=3237) line is also
170ER3CG present (1976ME04).
170ER  G  3564
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170ER CG            (|G{-|g0}){+2}/|G=24 meV (1976ME04) if J=1 to GS transition.
170ER  G  3619
170ER CG            (|G{-|g0}){+2}/|G=90 meV if J=1 to GS transition; however,
170ER2CG probable doublet feeding 0 and 79 levels (1976ME04). Presumably
170ER3CG includes 3623 to GS and 3695 to 79 transitions reported in 1996MA18.
-----------------
170ER  L 0.0          0+                                                    A
170ER  L 78.6         2+                                                    A
170ER  L 1824       1 1-                5.7 FS    5              11.6      10B
170ER3 L FLAG=D
170ER CL            (|G{-|g0}){+2}/|G: weighted average of 11.4 meV 11 (1976ME04)
170ER2CL and 12.0 meV 19 (1996MA18).
170ER CL           K=0 (1996MA18).
170ER  G 1745         163     5
170ER CG E          from 1973ME17.
170ER CG            Branching: from weighted average of |G{-|g1}/|G{-|g0}=1.64 8
170ER2CG (1996MA18), 1.63 7 (1976ME04)
170ER  G 1824       1 100       E1                                          B
170ER CG E          from 1991ZI01.
170ER  L 1973       2                                           0.6       5
170ER CL            (|G{-|g0}){+2}/|G: from 1976ME04, assuming J=1.
170ER  G 1973                                                             A
170ER  L 2039       2  1,2              0.10 PS   3              1.2       3
170ER CL           ^T{-1/2} and (|G{-|g0}){+2}/|G: if J=1 (1976ME04).
170ER  G 1960         93     10
170ER CG           Branching: from Adopted Gammas.
170ER  G 2039         100    10
170ER  L 2133       2 1                 62 FS     9              3.8       4
170ER CL            (|G{-|g0}){+2}/|G: weighted average of 3.7 meV 5 (1976ME04)
170ER2CL and 3.8 meV 5 (1996MA18).
```

From Γ_1/Γ_0

From W(θ) and lin. pol.

```
170ER  G 2054         39     10
170ER CG           Branching: from |G{-|g1}/|G{-|g0} in 1976ME04.
170ER  G 2133         100       D
170ER  L 2685       2                                          0.1       9    ?
170ER CL           (|G{-|g0}){+2}/|G: assuming J=1 (1976ME04).
170ER  G 2685                                                          A  ?
170ER  L 2701       2 1                 23 FS     3              9.1       12
170ER CL           (|G{-|g0}){+2}/|G: weighted average of 11.5 meV 22 (1976ME04)
170ER2CL and 8.5 meV 11 (1996MA18).
170ER CL           K=1 (1996MA18).
170ER  G 2622         48      6
170ER CG           Branching: from weighted average of |G{-|g1}/|G{-|g0}=0.48 7
170ER2CG (1996MA18), 0.49 13 (1976ME04).
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^{58}Fe(p,p')

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59CO    58FE(P,P')                    1971LI14
59CO  H TYP=FUL$AUT=CORAL M. BAGLIN$CIT=NDS 95,215 (2002)$CUT=8-Feb-2002$
59CO C  Others: 1975BR29 (58FE(P,P'G)), 1972PE23.
59CO C  1971LI14: EP=2.0-3.1 MEV, but data not analyzed beyond 2.65 MEV;
59CO2C  measured SIGMA(EP,THETA), THETA=90 DEG, 120 DEG,
59CO3C  135 DEG, and 160 DEG, beam resolution 300-400 EV.
59CO C  See 1972PE23 for correlations between fine structure widths of 14
59CO2C  59FE(GS) analog fragments in (P,P), (P,P') and (P,G), EP AP 2210-2300.
59CO CL           Data are from 1971LI14. The fragmented analogs of
59CO2CL 59FE(GS) (JPI=3/2-, 14 fragments) and 59FE(287) (JPI=1/2-, 10
59CO3CL fragments) have their centroids at EP(lab)=2220 5 and 2512 5,
59CO4CL respectively. A third analog near EP=2.98 MEV was identified but not
59CO5CL analyzed. Since EP is well below the COULOMB barrier, only s-, p- and
59CO6CL d-wave resonances are expected.
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59CO CL E          Calculated as EP(C.M.)+SP, assuming SP=7363.7 6 (1995AU04).
59CO CL J          From multilevel, multichannel R-matrix analysis of
59CO2CL SIGMA(EP,THETA).
59CO CL S          |G{-p0} in EV (1971LI14). |G{-p'}(811) was neglected in
59CO2CL analysis by 1971LI14 and, typically, WIDTHG<<|G{-p0} (see (P,G)), so
59CO3CL |G{-p0} AP WIDTH. See 1972PE23 for additional |G{-p0} and |G{-p1}
59CO4CL data.
59CO CL L          Laboratory proton energy of resonance (1971LI14); DE AP 3
59CO2CL KEV (absolute), 0.2 KEV (relative). EP from 1972PE23, 1975BR29 AP 5 KEV
59CO3CL higher.
59CO CL L$LABEL=EP(LAB)
59CO CL S$LABEL=|G{-p0} EV
59CO CL E(A)       Possible 59FE(GS) analog fragment (1971LI14). Analog energy
59CO2CL estimated to be 9545 5 (1971LI14).
59CO CL E(B)       Possible 59FE(287 level) analog fragment (1971LI14). Analog
59CO2CL energy estimated to be 9835 5 (1971LI14).
59CO  L 9465.3     30(3/2-)                                2137.8  10        5A
59CO  L 9491.3     30 1/2+                                 2164.3  30       10
59CO  L 9513.7     30(3/2-)                                2187.1  30       10A
59CO  L 9523.1     30 1/2+                                 2196.6  15        8
59CO  L 9525.4     30 1/2+                                 2199.0  15        8
59CO  L 9534.9     30(3/2-)                                2208.6  30       10A
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↑ $S_p + E_{res}$(c.m.) $E_p$res (lab) ↑ ↑ Γ_{p0}

^{92}Zr(p,p'), (pol p,p) IAR

```
93NB     92ZR(P,P'), (POL P,P) IAR     1970KE02                    97NDS    199703
93NB  H TYP=FUL$AUT=CORAL M. BAGLIN$CIT=NDS 80, 1 (1997)$CUT=1-Nov-1996$
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93NB C   Includes 92ZR(P,P'G) and 92ZR(P,N) IAR studies.
93NB C   Others: 1965Ro23, 1968Th07, 1969El08, 1969Wi15, 1974Cu04.
93NB C   1974Cu04: (P,P'G); EP=4.85-5.25 MEV, |q(lab)=30 DEG, 45 DEG, 90 DEG;
93NB2C   measured angular correlation through 92ZR(2+, 934 level) and
93NB3C   93NB(4+, 1494 level) in vicinity of analog of 93ZR(GS).
93NB C   1970Ke02: (P,P'); EP AP 5.8 MEV to 10.0 MEV, 95% 92ZR target, cooled
93NB2C   SILI detectors, |q(lab)=60 DEG-170 DEG (10 DEG steps),
93NB3C   FWHM AP 40 KEV; deduced E, WIDTH, partial WIDTHP for each IAS
93NB5C   from ^S-matrix analysis of excitation functions across IAS,
93NB6C   and L for scattered protons from p'(|q)
93NB7C   measured on resonance.
93NB C   1969Wi15: (POL P,P); E(pol p) AP 5.0-8.3 MEV, surface
93NB2C   barrier detectors, measured energy and angle dependence
93NB3C   of analyzing power for elastic scattering;
93NB4C   deduced E, JPI, WIDTH, and WIDTHP0 for IAS.
93NB C   1969El08: (POL P,P); E(pol p)=4.65-8.65 MEV; deduced
93NB2C   E, WIDTH, WIDTHP0, determined JPI for IAS.
93NB C   1965Ro23: (P,P), (P,N); EP AP 5.75-6.25 MEV, 1-5 KEV thick targets;
93NB2C   measured excit across 93ZR(947 level) analog; deduced
93NB3C   |G{-p0} and WIDTH (see also 1968Th07).
93NB C   Partial WIDTHP (1970Ke02) for protons feeding GS, 934, 1382, 1847
93NB2C   and/or 2067 levels of 92ZR are given in comments. |G{-p0} deduced by
93NB3C   1969Wi15 and 1969El08 agree with data of 1970Ke02 within better than a
93NBxC   factor of 2.
93NB CL E          From SP=6043.2 16 (1995Au04) and EP for resonance (1970Ke02).
93NB2CL DE not stated; agreement with EP from 1969Wi15 is excellent.
93NB CL J          From L and analyzing power data of 1969Wi15
93NB CL J(B)       From L and analyzing power data of 1969El08.
93NB CL T          WIDTH from 1970Ke02; weighted average of all determinations.
93NB2CL Consistent with data of 1969El08 and 1969Wi15.
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```
93NB CL L          From 1970Ke02.
93NB CL S          EP(lab) for resonance (1970Ke02); DE not stated by authors.
93NB2CL 60 KEV correction advised by authors has been applied, thereby
93NB3CL producing excellent agreement with EP from 1969Wi15.
93NB CL S$LABEL=EP(LAB)
93NB CL J(A)       L=0 from interference pattern in excitation functions
93NB2CL in (P,P) (1970Ke02).
93NB  L 11059        5/2+              13 KEV    5              5070
93NB CL            WIDTHP0=4 KEV.
93NB2CL All data from 1969Wi15.
93NB CL            Analog of 93ZR(GS).
93NB  L 11981      5 1/2+              90 KEV    9     0        6000        A
93NB CL E          from EP=6002.5 50 from 1968Th07.
93NB CL            Other WIDTH: 80 KEV 6 (1968Th07).
93NB CL            |G{-p0}=45 KEV 5 (1970Ke02), 37 KEV 3 (1968Th07).
93NB CL            Analog of 93ZR(947 level).
93NB  L 12503        3/2+              38 KEV    3     2        6530
93NB CL            |G{-p0}=8.0 KEV 8; |G{-p1}=5.2 KEV 15; |G{-p3}=0.72 KEV 2;
93NB2CL |G{-p4}=1.8 KEV 4.
93NB CL            Analog of 93ZR 1425 or 1450 level.
93NB  L 12993        1/2+              42 KEV    3     0        7025        A
93NB CL            WIDTHP0=10 KEV 1; |G{-p2}=3.5 KEV 11; |G{-p4}=0.45 KEV 22.
93NB CL            Possible analog of 93ZR 1909 or 1919 level.
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