The Abdus Salam International Centre for Theoretical Physics

United Nations Educational, Scientific and Cultural Organization

IAEA International Atomic Energy Agency

1939-27

Joint ICTP-IAEA Workshop on Nuclear Structure and Decay Data: Theory and Evaluation

28 April - 9 May, 2008

ENSDF MODEL EXAMPLES: II
Adopted Levels, Gammas Datasets

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Adopted Dataset =

condensation of data from all Decay and Reaction datasets
(comprehensive; data readily traceable to source data sets)
+
New types of records, information:
Q
XREF
g.s. and isomer decay branching
Nuclear moments
Nuclear radius information
B(ML)W, B(EL)W
Jπ arguments
+
New presentation of intensity data

Q-value data

```
169TM  Q -910        4 8033.6 15 5572.2 11 1199.7 13    2003AU03

 81ZR  Q -11.0E3    SY 11.0E3 15 4.56E3 24              2003AU03
 81ZR CQ            |DQ(|b)=1500 (2003Au03).
 81ZR CQ            Q(EC-P)=4.53E3 17 (2003AU03).

169IR  Q -9710      SY 11410  SY -621   24 6140   5     2003AU03,2005SC22
169IR CQ            |DQ(|b)=200, |DS(n)=150 (2003AU03).
169IR CQ            QA: from EA=5995 5, THE WEIGHTED AVERAGE OF EA=5993 4
169IR2CQ (2005SC22) AND EA=6005 8 (1999PO09), ASSUMING A GS to GS transition.
169IR3CQ QA=6151 8 IN 2003AU03 BASED ON THE DATUM FROM 1999PO09 ALONE.
```

Cross-Reference information

```
186W   XA186TA B- DECAY
186W   XB186RE EC DECAY (3.7183 D)
186W   XC186W(N,N'G)
186W   XDCOULOMB EXCITATION
186W   XE186W(G,G')
186W   XG186W(D,D'), (P,P'), (A,A')
186W   XH184W(T,P)
186W   XI186W(N,N')
186W   XJMUONIC ATOM
186W   XK186W(238U,238U'G): DELAYED G'S
186W  PN                                                                  6
186W   L        0.0   0+                  STABLE                         A
186W X L XREF=ABCDEGHIJK
```

```
186RE  L    417.792 8 (5)-                                                D
186REX L XREF=BDE(*)
186RE CL J         M1+E2 149G to (4)-; no primary transitions to this level in
186RE2CL (N,G) E=2-110 EV; band assignment.
186RE  G    144.152 5     103LT [M1,E2]                1.4     4           @
?
186RE  G    148.994 5     10021 M1+E2     1.2    +8-4  1.21   16
186RE  G    271.47 10      40 6 [E2]                   0.1193
186RE  L    420.559 7 (4)+                                                F
186REX L XREF=BE(*)
186RE CL J$M1+E2 107G to (3)+ 314; band assignment
186RE  G    106.550 4   100     M1+E2      1.7   +37-7 3.5     3

166HO  L 286.96    13 9-                                                  B
166HOX L XREF=ABD(287.5)F

 93ZR  L  2457.65  15 (1/2+,3/2)
 93ZRX L XREF=B(*)CE
 93ZR CL J         LOGF1UT<8.5 from 1/2-; G to 5/2+.
 93ZR2CL L(D,P)=2 for 2458 and/or 2474 level(s).
```

Nuclear Moments and Nuclear Radius Information:

```
 81BR  L      0.0    3/2-              STABLE                            Z
 81BRX L XREF=ABCDEFGHIKL
 81BR2 L MOMM1=+2.270562 4
 81BR CL MOMM1     From NMR (1989Ra17 FROM 1972BL07); relative to MOMM1(2H).
 81BR3 L MOME2=+0.2615 25
```

```
 81BR CL MOME2      FROM 2001BI17 (REASSESSMENT OF ATOMIC BEAM DATA FROM
 81BR2CL 1954KI11).  OTHERS: +0.266 4 (2004AL08) AND +0.254 6 (2000HA64),
 81BR3CL +0.276 4 (1989RA17 FROM 1978TA24; 1998SE09); ALL REASSESSMENTS OF
 81BR4CL ATOMIC BEAM DATA OF 1954KI11. Sternheimer CORRECTION INCLUDED.
 81BR4 L MOMM3=+0.129
 81BR CL MOMM3      Atomic beam magnetic resonance (1966Br03).
 81BR CL            <r{+2}>{+1/2}(CHARGE)=4.1599 21 (2004AN14).

169TM  L 8.41017   11 3/2+             4.09 NS   5                          A
169TMX L XREF=ABDEGHJ
169TM2 L MOMM1=+0.5148 48$ MOME2=-1.2 1
169TM CL MOMM1      MOSSBAUER (1989RA17); value relative to MOMM1=-0.2316 15
169TM2CL for 0.0 level.
169TM CL MOME2      MOSSBAUER (weighted average from 1989RA17); value
169TM2CL includes polarization correction.

169TM  L 316.14633 11 7/2+             659.9 NS  23                          B
169TMX L XREF=BDHJ
169TM2 L MOMM1=+0.156 8
169TM CL MOMM1      DPAC (1989RA17, FROM g=0.044 2 (1972NI03)).

 81KR  L      0.0    7/2+              2.29E+5 Y 11                          Z
 81KR2 L %EC=100$MOMM1=-0.908 2$MOME2=+0.644 4
 81KRX L XREF=ABCDEGHI
 81KR CL MOMM1      from collinear LASER fast-beam spectroscopy (1995Ke04);
 81KR3CL relative to 83KR standard, diamagnetic correction included.
 81KR3CL OTHER: -0.909 4 (1993Ca41; LASER RESONANCE FLUORESCENCE spectroscopy,
 81KR4CL 83KR standard).
 81KR CL MOME2      +0.629 13 (1993Ca41; LASER RESONANCE FLUORESCENCE
 81KR2CL spectroscopy, IF Q(83KR)=0.253 5 (1989RA17)), ADJUSTED BY 2001KE15
```

```
 81KR3CL TO +0.644 4 ASSUMING THEIR VALUE OF 0.259 1 FOR MOME2(83KR).
 81KR4CL Other: +0.64 7 (1995Ke04, COLLINEAR LASER FAST-BEAM SPECTROSCOPY);
 81KR5CL uncertainty includes uncertainty in electric-field gradient and
 81KR6CL the Sternheimer correction.
 81KR CL           DAVRSQ(86KR,81KR)=+0.099 (1995KE04); UNCERTAINTY 0.004
 81KR2CL (STATISTICAL ONLY), 0.018 (INCLUDING SYSTEMATIC UNCERTAINTIES), 0.034
 81KR3CL (TOTAL UNCERTAINTY).
 81KR CL           DAVRSQ(80KR,81KR)=-0.015 8 (1996LI25; STATISTICAL
 81KR2CL UNCERTAINTY ONLY).

169LU  L 0.0          7/2+             34.06 H   5                          a
169LUX L XREF=ABDE
169LU2 L %EC+%B+=100$MOMM1=2.295 4 (1998GE13)$MOME2=3.480 25 (1998GE13)
169LU CL           DAVRSQ(170,169)=-0.078 8 (1998GE13).
169LU CL MOMM1     From collinear laser spectroscopy. Other MOMM1: 2.297 13
169LU2CL from NMR on oriented nuclei (1996KO26).
169LU CL MOME2     From collinear laser spectroscopy. Other MOMM1: 3.42 12
169LU2CL from NMR on oriented nuclei (1996KO26).
169LU CL           <r{+2}>{+1/2}(CHARGE)=5.329 4 (2004AN14).
```

Decay branching

```
169IR  L 0.0          (1/2+)           0.353 S   4
169IR2 L %A=45 12$%EC+%B+=?$ %P=?
169IRX L XREF=AC
169IR CL           %A: WEIGHTED AVERAGE OF 42 15 (2005SC22) AND 50 18
(1999PO09)
169IR CL           %P: see 1983AL09 and 1984GR14 for discussions of
169IR2CL expected proton decay; SP (=-621 24 (2003AU03)) consistent with
```

```
169IR3CL predictions.

169W   L 0.0          (5/2-)           74 S      6                          A
169W X L XREF=A
169W 2 L %EC+%B+=100
169W  CL           %EC+%B+: only EC decay has been observed.
169W 2CL %A AP 0.01 can be estimated from extrapolation of
169W 3CL log T(ALPHA) versus log QA for 159W, 161W, 163W.

 81ZN  L 0            (5/2+)           0.29 S    5
 81ZN2 L %B-=100$%B-N=7.5 30
 81ZN CL           %B-N and T from 1991Kr15.  HOWEVER, FROM 80GA IN 81ZN
 81ZN2CL DECAY SPECTRUM, 2005KOZU ESTIMATE %B-N(81ZN)>10.

 81ZR  L 0.0          (3/2-)           5.5 S     4                          a
 81ZR2 L %EC+%B+=100$ %ECP=0.12 2 (1999HU05)
 81ZRX L XREF=A
 81ZRF L FLAG=YZ
 81ZR CL %ECP      FROM 1999HU05, BASED ON COMPARISON OF MEASURED
 81ZR2CL T WITH PARTIAL PROTON T CALCULATED USING STATISTICAL MODEL, ASSUMING
 81ZR3CL 24% 8 OF DELAYED PROTONS (1977FAZW, 1980HAZG; p-386G COIN) FEED
 81ZR4CL THE FIRST 2+ STATE OF 80SR.

169PT  L 0.0          (7/2-)           7.0 MS    2
169PT2 L %A AP 100
169PTX L XREF=ABC
169PT CL %A        1999SE14 REPORT THAT NUMBER OF 169PT DAUGHTER |a'S
CORRELATED
169PT2CL WITH 173HG DECAYS IS CONSISTENT WITH %A=100 FOR 169PT. THIS IS
169PT3CL CONSISTENT WITH gross |b decay theory PREDICTION OF A partial |b
```

```
169PT4CL half-life of AP 1 S (1973TA30) and MICROSCOPIC THEORY PREDICTION OF
169PT5CL 0.26 S (1997MO25), implying %EC+%B+ AP 0.7 AND 2.7, RESPECTIVELY.
169PT5CL Only |a DECAY has been observed for 169PT.
```

Reduced Transition Probabilities

Calculated by RULER in most cases

```
170TM  L  219.7060  6 (2)-                0.25 NS  3                        A
170TM2 L XREF=ABCDFHI
170TM CL J         220G to 1- g.s. and 105G to (3)- 115 are M1+E2.
170TM CL T         from BE2=0.085 10 in Coulomb excitation and adopted MR and
170TM2CL branching.
170TM  G 69.988    1  4.2     6 E2                      12.67
170TMB G BE2W=240 50
170TM  G 105.162   1  28.6    3M1+E2      0.4    3     2.66    5
170TMB G BM1W=0.0045 11$BE2W=30 +40-30
170TM  G 180.994   1  100     9 M1+E2    0.28    3     0.562   9
170TMB G BM1W=0.0033 6$BE2W=3.6 10
170TM  G 219.705    1 77.2    6 M1+E2    1.29    10    0.246   7
170TMB G BM1W=0.00058 10$BE2W=9.1 11
170TM CG           BE2W: from measured BE2.
```

RULER gives 9.1 *13*

```
192OS  L 1341.153  11 3-
192OSX L XREF=DEFGHILJKNR
192OSB L BE3UP=0.131 9 (1988BO08)
192OS CL           BE3UP: FROM (E,E').  OTHER VALUE: 0.37 4 FROM COULOMB
192OS2CL EXCITATION.
192OS CL J         E3 EXCITATION IN (E,E') AND COULOMB EXCITATION.
192OS2CL G-RAY BRANCHINGS TO 2+, 3+, AND 4+ LEVELS IN 192OS(P,P'G),
192OS2CL (D,D'G) FIT ALAGA RULE FOR E1.
```

```
192OS  G 271.594    8 98     10                                          M
192OS CG           OTHER RI: 58 4 AND 47 8 FROM (P,P'G), (D,D'G).
192OS  G 431.4      4 34      3
192OS  G 650.81    15 12.8   11
192OS CG           OTHER RI: 26 4 FROM (P,P'G), (D,D'G).
192OS  G 852.19     2 100     5
192OSL G FL=489.0602
192OS  G 1135.5     3 28.2   15
192OS  G 1341.15
S

168ER  L   1431.466 4        3-        41 PS                            E
168ERX L XREF=BD(*)EFGHLMO
168ER CL J         3-,4- from average resonance capture; E1 G to 2+.
168ER CL T         from 1987Me04 (see 168TM EC decay).
168ER  G    535.64221 0.35    6 [E1]                   0.00480
168ERB G BE1W=6.2E-8
168ER  G   1167.39615 98     10    E1                   1.04E-3
168ERB G BE1W=1.7E-6
168ER  G   1351.54  4 100     9    E1                   8.93E-4
168ERB G BE1W=1.1E-6
168ER  G  1431.7    4 0.50   18 [E3]                   0.00328              H
168ERB G BE3W=3.6
168ER CL           BE3W=3.7 5 FROM BE3=0.043 6 IN COULOMB EXCITATION
(1978MC02).
```

JPi arguments

```
166GD  L 0.0          0+                4.8 S     10
```

```
166GD2 L %B-=100
166GD CL J         GS OF EVEN-EVEN NUCLEUS.

166ER  L 859.389    5 3+                4.5 PS     8                          B
166ERX L XREF=ABDEFIJKL
166ER CL J         M1 73G to 2+ 786, E2+M1 594G TO 4+ 265.

169TM  L 345.028    3  5/2-                                                   C
169TMX L XREF=BDHJ
169TM CL J         E1 206G TO 7/2+ 139; E1(+M2) 337G TO 3/2+ 8-KEV LEVEL.

166HO  L 171.0738  12 3-                                                      a
166HOX L XREF=ABCDFGH
166HO CL J         M1 117G to 2- 54; (D,P) CROSS SECTION FINGERPRINT.

166LU  L 135.9     3 1+
166LUX L XREF=B
166LU CL J         EC decay from 0+ is unhindered allowed (LOGFT=4.5).
166LU CL CONF      (|p 7/2[523])-(|n 5/2[523]) (1974DE09).

 81BR  L SP+5003   105/2+              32 KEV    3
 81BRX L XREF=J
 81BR CL J         L(P,P)=2; IAS.
 81BR CL           Analog of 5/2+ 81SE(1304 level).

 81RB  L  153.481  20 5/2-             0.21 NS   10                          Y
 81RBX L XREF=ABCDHI
 81RB CL J         L(3HE,D)=3+1 for E=184 KEV doublet; this level must
 81RB2CL correspond to the L=3 component since J(188 level)<5/2;
 81RB3CL ^D(+Q) G to 3/2-.
```

```
 81AS  L        0    3/2-                33.3 S    8
 81AS2 L %B-=100
 81ASX L XREF=ABCD
 81AS CL J         L(D,3HE)=1; LOGF1UT<8.5 (LOGFT=6.0) to 5/2+.

166TM  L 82.298    8 1+                  385 PS    40
166TMX L XREF=ABCD
166TM CL J         ALLOWED EC DECAY from 0+ 166YB (LOGFT=4.9).

166TB  L 40.00     16 (-)
166TBX L XREF=A
166TB CL J         40G NOT E1 TO (2-); 40G IN PROMPT COINCIDENCE WITH G FEEDING
166TB2CL THE 40 LEVEL.

166ER  L 1458.154   9(2)-                                                    C
166ERX L XREF=ADF(1452)I
166ER CL J         E1 G's to 2+ and 3+; fit to a band.


169YB  L             1/2,3/2,5/2+
169YB CL J(L)      Primary transition from 1/2+ in 168YB(N,G) E=thermal.

 81GE  L        0    (9/2+)              7.6 S     6                         A
 81GE2 L %B-=100
 81GEX L XREF=AB
 81GE CL J         shell model systematics for N=49 nuclei

 81SR  L    119.76  4(1/2+)              24 NS     4                         W
 81SRX L XREF=ABCEF
```

```
 81SR CL J         217G from (5/2+) has mult.=(E2) and linear polarization
 81SR2CL which excludes a J to J-1 transition; 5/2 unlikely from 119G excit.
 81SR3CL PI: BE1W more typical in this mass region than BM1W for
 81SR4CL 119G to 1/2-.  HOWEVER, LOGFT=6.5 FROM (5/2+) IS FAR TOO LOW FOR A
 81SR5CL DJ=2, DPI=NO DECAY.

166LU  L 57.2       3(1)-                                                Z
166LUX L XREF=B
166LU CL J         E1 79G from 1+ 136; 23G to 3(-) 34; CONFIGURATION
ASSIGNMENT.
166LU CL CONF      (|p 7/2[404])-(|n 5/2[523]) (1974DE09).

166LU  L 144.79    14 (6,7,8)-
166LUX L XREF=CE
166LU CL J         E1 61G TO (5,6,7)+ 84 LEVEL; DJ LE 1 142G FROM J GE 7 287.

 81Y   L 268.74     7 (9/2+)                                            Z
 81Y X L XREF=AB
 81Y F L FLAG=G
 81Y  CL J         STRETCHED (E2) G to (5/2+); G to (7/2+).

166HF  L 1603.05   21 (2+,3,4+)
166HFX L XREF=A
166HF CL J         1144G TO 2+ 159, 1133G TO 4+ 470.

166HF  L   2680.1  16(10-)                                              L
166HFX L XREF=C
166HF CL J         STRETCHED Q 484G TO (8-) 2197; BAND ASSIGNMENT.

166DY CL J(A)      ESTABLISHED JPI FOR THE GS AND 76 LEVEL COMBINED WITH
```

```
166DY2CL KNOWN E2 MULTIPOLARITY FOR THE J=4 TO J=2 177-KEV TRANSITION AND
166DY3CL A REGULAR SEQUENCE OF LEVEL ENERGIES ENABLE THE ASSIGNMENT OF
166DY4CL DEFINITE JPI TO GS BAND MEMBERS WITH J LE 14.

169TM CL J(H)      DEFINITE JPI for GS band established THROUGH J=21/2 BASED ON
169TM2CL band structure and INDEPENDENTLY ESTABLISHED JPI(8 LEVEL)=3/2+, AND
169TM3CL INTRABAND M1+E2 110G AND E2 118G FROM 118 LEVEL.
166HF CL J(H)      The interband transition between side band 1 and the
166HF2CL ground-state band show angular distributions of pure
166HF3CL stretched dipole type, most likely E1.

166HF CL J(I)      Transitions connecting the two side bands have positive
166HF2CL anisotropies and are interpreted as mixed M1,E2 transitions (1987BL06)
166HF3CL IN (HI,XNG).

169TM CL E(Q),J(Q) From 169TM(G,G').  ^D EXCITATION FROM 1/2+ IS SUGGESTED BY
169TM2CL 1999HU01 IN (G,G') SO J=(1/2,3/2) IS ASSIGNED; FURTHER, PI=+ IS
169TM3CL ASSIGNED WHENEVER BE1W SIGNIFICANTLY EXCEEDS RUL.

166IR  L 172        6 (9+)             15.1 MS   9
166IR2 L %A=98.2 6 (1997DA07)$%P=1.8 6 (1997DA07)
166IRX L XREF=B
166IR CL J         h{-11/2} PROTON EMISSION OBSERVED FROM LEVEL (1997DA07).
166IR2CL PROBABLE CONFIGURATION={ (|p h{-11/2})~#(|n f{-7/2})}; THE
166IR3CL Nordheim WEAK RULE FAVORS JPI=9+ OR POSSIBLY 2+ (WHICH SHOULD NOT BE
166IR4CL ISOMERIC) FOR THE LOWEST ENERGY STATE FOR THIS CONFIGURATION
(1997DA07)
166IR5CL (POSSIBLY |p 11/2[505]+|n 7/2[514] AT SMALL PROLATE DEFORMATION).
```

Band and sequence descriptions

```
 93TC CL BAND(Y)   DOMINANT CONF=(|p p{-1/2}g{-9/2}{+4}).
 93TC2CL Seniority=1 states. (1994Ro08,1995Gh08).
 93TC CL BAND(Z)   DOMINANT CONF=(|p p{-1/2}{+2}g{-9/2}{+3}).
 93TC2CL Seniority=1 states. (1994Ro08,1995Gh08).

 93RH CL BAND(A)   POSSIBLE PI=+, YRAST SENIORITY=3 STATE.
 93RH2CL By analogy with shell-model calculations for 91TC.

169TM CL BAND(AH)  1/2[411] BAND.
169TM2CL BAND PARAMETERS: A=12.5, ^B=-4.8, a=-0.78 (1/2, 3/2, 5/2, 7/2, 9/2
169TM3CL levels).
169TM CL BAND(B)   7/2[404] BAND.
169TM2CL BAND PARAMETERS: A=13.3, B=-6.7 (7/2, 9/2, 11/2, 13/2 levels).
169TM CL BAND(C)   1/2[541], |a=+1/2 BAND.
169TM2CL BAND PARAMETERS: A=9.1, ^B=+0.8, a=+3.8 (J=1/2 THROUGH 21/2 levels);
169TM3CL HOWEVER, PARAMETERS VARY SIGNIFICANTLY DEPENDING ON WHICH LEVELS ARE
169TM4CL INCLUDED IN THE FIT.
169TM CL BAND(c)   1/2[541], |a=-1/2 BAND.
169TM2CL SEE COMMENT ON SIGNATURE PARTNER BAND.
169TM CL BAND(E)   3/2[411] band + 1/2[411] G vibration.
169TM2CL BAND PARAMETERS: A=12.6, B=-11.9 (3/2, 5/2, 7/2, 9/2 levels).
169TM3CL CONFIGURATION INCLUDES CONTRIBUTION FROM K-2 G VIBRATION BUILT ON
169TM4CL 1/2[411] ORBITAL.

169YB CL BAND(AJ)  7/2[633] BAND.
169YB2CL A=7.9, B=9.5 (7/2, 11/2, 15/2, 19/2 levels); A=8.1, B=4.5
169YB3CL (9/2, 13/2, 17/2, 21/2 LEVELS).
```

Parameters are particularly important for K=1/2 bands

```
169YB CL BAND(BK)  1/2[521] BAND.
169YB2CL A=11.5, a=+0.80 (1/2, 3/2, 5/2, 7/2, 9/2 levels).
169YB CL BAND(F)   KPI=3/2[521] BAND.
169YB2CL INCLUDES LARGE ADMIXTURE OF K-2 G vibration BUILT ON 1/2[521]
169YB3CL (1968MI08).  A=12.2, B=6.4 (3/2, 5/2, 7/2, 9/2 levels).
169YB CL BAND(G)   KPI=3/2+ BAND.
169YB2CL 7/2[633] K-2 G vibration WITH SOME 3/2[651] ADMIXTURE (1968MI08).
169YB CL BAND(IP)  1/2[510] BAND.
169YB2CL ADMIXED WITH G vibration, POSSIBLY THE K-2 VIBRATION BUILT ON
5/2[512];
169YB3CL tentative assignment.
169YB CL BAND(R)   7/2[503]? BAND.
169YB2CL TENTATIVE BAND ASSIGNMENT FROM 1980BA07.
169YB CL BAND(S)   B VIBRATION BAND.
169YB2CL BUILT ON 7/2[633] GS; BAND ASSIGNMENT FROM 1988DZZW.

169LU CL BAND(D)   5/2[402] |a=+1/2 BAND (1993OG01).
169LU2CL BAND PARAMETERS: A=14.8, B=-13.9 (5/2, 7/2, 9/2, 11/2 levels).
169LU3CL Strongly mixed with 1/2[411] |a=+1/2 band.
169LU3CL FIRST BAND CROSSING AT ~h|w AP 0.26 MEV, ALIGNMENT GAIN AP 6.1~h.
169LU CL BAND(d)   5/2[402] |a=-1/2 BAND (1993OG01).

169HF CL BAND(G)   PI=+, |a=+1/2 3-quasineutron band (2001SC49).
169HF2CL Configuration=|n[(5/2[642])(1/2[521])(5/2[523]] (^AMF BAND).
169HF3CL IN-BAND ^B(E2) VALUES POSSIBLY ENHANCED BY PRESENCE OF COUPLING TO
169HF4CL 5/2[642] G-VIBRATION BAND.

169W  CL BAND(B)   PI=+, |n i{-13/2} BAND.
169W  CL BAND(C)   PI=(-) SIDE BAND.
```

```
169RE CL BAND(C)    |a=+1/2, 3-QUASIPARTICLE BAND (2002ZH42).
169RE2CL CONFIGURATION=(|p 9/2[514])~#(|n i{-13/2})(|n f{-7/2} OR h{-9/2}).

168ER CL BAND(M)    KPI=0+ BAND (4).
168ER2CL A=9.9 (J=0, 2, 4 LEVELS).
168ER CL BAND(P)    KPI=2+ BAND (3).
168ER2CL A=10.7 (J=2, 3, 4 LEVELS).

166HF CL            Quasiparticle orbitals used in band labels are as follows:
166HF CL $A=(|n 5/2[642]), |a=+1/2.
166HF CL $B=(|n 5/2[642]), |a=-1/2.
166HF CL $C=(|n 3/2[651]), |a=+1/2.
166HF CL $D=(|n 3/2[651]), |a=-1/2.
166HF CL $E=(|n 5/2[523]), |a=+1/2.
166HF CL $F=(|n 5/2[523]), |a=-1/2.
166HF CL $^G=(|n 3/2[521]), |a=+1/2.
166HF CL $H=(|n 3/2[521]), |a=-1/2.
166HF CL $a=(|p 7/2[404]), |a=+1/2.
166HF CL $b=(|p 7/2[404]), |a=-1/2.
166HF CL $k=(|p 1/2[660]), |a=+1/2.
166HF CL $e=(|p 9/2[514]), |a=+1/2.
166HF CL $f=(|p 9/2[514]), |a=-1/2.
166HF CL $g=(|p 1/2[541]), |a=+1/2.
166HF CL BAND(A)    ^BC BAND (2000RI11).
166HF CL BAND(B)    ^AB BAND (2000RI11).
166HF2CL YRAST ABOVE J=14.  ALIGNMENT GAIN ~ 10~h AT ~h|w AP 0.25 MEV.
166HF3CL BECOMES ABCDfg BAND AT HIGH SPIN WITH POSSIBLE ADMIXTURE OF ABEFfg.
166HF CL J(B)       JPI ESTABLISHED FOR J=12 THROUGH J=42 BAND MEMBERS BASED
166HF2CL ON SMOOTH PROGRESSION OF EG FOR INTRABAND CASCADE, JPI=14+ FOR
166HF2CL 3007 LEVEL AND E2 INTRABAND 275G TO 2566.
```

CSM notation can be used in band descriptions IF labels are identified by their respective orbitals.

```
166HF CL BAND(C)    ^EFBC BAND (2000RI11).
166HF CL BAND(G)    KPI=10-, |a=0 gfAE BAND (2000RI11).
166HF2CL LIKELY CONFIGURATION: |n (5/2[642]+5/2[523])+ |p (1/2[541]+9/2[514]);
166HF3CL STRONGLY SUPPORTED BY MEASURED ^B(M1)/^B(E2) RATIOS.
166HF CL BAND(g)    KPI=10-, |a=1 geAE BAND (2000RI11).
166HF2CL SEE COMMENT ON KPI=10- SIGNATURE PARTNER BAND.
166HF CL BAND(H)    KPI=5- ^AE BAND (2000RI11).
166HF2CL ^A=13.7 IF ^B=0.
166HF CL BAND(J)    ^AGBC BAND (2000RI11).
166HF2CL LARGE ALIGNMENT, CONSISTENT WITH FOUR-QUASINEUTRON STRUCTURE.
166HF CL BAND(L)    ^BE BAND (2000RI11).
166HF2CL LOW ALIGNMENT AT LOW J
166HF CL BAND(O)    Band 2 (2000RI11).

170TM CL BAND(E)    KPI=(2)- BAND.
170TM2CL Configuration=(|p 1/2[411])-(|n 5/2[512]). ROTATIONAL PARAMETER:
170TM3CL A=11.0.  BAND IS ANOMALOUSLY POPULATED IN (T,A).
170TM CL BAND(H)    KPI=(0)+ BAND.
170TM2CL Configuration: (|p 7/2[404])-(|n 7/2[633]).  ROTATIONAL PARAMETER:
A=7.2
170TM3CL (J=even); +36 KEV Newby SHIFT.

166HF CL BAND(D)    Band 3 (2000RI11).
166HF CL BAND(Y)    KPI=2+ G-VIBRATIONAL BAND.

 93SR CL BAND(A)    5/2+ band.
 93SR2CL Possible (stretched) coupling of (|n d{-5/2}){+-1} to 94SR core.
 93SR CL BAND(B)    (11/2-) band.
 93SR2cL Possible coupling of (|n d{-5/2}){+-1} to octupole states in 94SR
core.
```

```
81SR CL BAND(B)    SD-2 band (2003Le08,1995Ch56).
81SR2CL Q(transition)=3.30 +27-21 (2003Le08), 3.8 +7-5 (1997De51,
81SR3CL reanalyzed data of 1995Ch56).
81SR4CL Configuration=|n5{+1}|p5{+0} (2003Le08).
81SR5CL Percent population=0.63 (2003Le08), |?1.0 (1995Ch56).
81SR6CL Probable (|p,|a)=(+,-1/2) corresponding to
81SR7CL configuration=((|n 1/2[431]){+-1}). Predicted |b{-2}=0.55 (1995Ch56)

AAZZ CL BAND(Z)    DJ=2 G CASCADE.

AAZZ CL BAND(Z)    G CASCADE FEEDING JPI=(37/2+) 5277.
```

Photon Intensities (strongest photon branch from level = 100)

```
93SR  L   986.12   5
93SRX L XREF=ABC
93SR  G 986.05    6 100

81RB  L  909.090  19 (3/2)-
81RBX L XREF=AF(*920)
81RB CL J         G to (5/2)+; LOGFT=5.8 from 1/2-. See also comment on
81RB2CL J(913 level).
81RB  G   197.32   8   2.5   7 [M1,E2]                0.05    3
81RB  G   206.98   7   8.4   8 [M1,E2]                0.044  22
81RB  G   422.47  15  10.4  15
81RB  G   465.80   5  34.2  20
81RB  G   607.88   3  38.6  14
81RB  G   663.6    3   2.4   5
```

```
 81RB  G   720.81   3 100    3
 81RB  G   909.03   3  76.7  25

169ER  L 654.06    25 (5/2-)
169ERX L XREF=CE
169ERF L FLAG=31
169ER  G 429.9     1  221    LT                                          &
169ER  G 579.3     4  7.1    17
169ER  G 589.6     3  100    21

169ER  L 769.56    10 (5/2-)
169ERX L XREF=ACE
169ERF L FLAG=41
169ER  G 545.0     6  15     LT                                          &
169ER  G 695.0     2  100    21
169ER  G 705.0     1  83     17
```

Example: ^{179}Hf

```
179HF    ADOPTED LEVELS, GAMMAS
179HF  H TYP=FUL$AUT=C. BAGLIN$CUT=30-Sep-2007$
179HF  Q -105.6    4 6098.99  87417.9  201803.8  15    2003AU03
179HF C  FOR hfs AND/OR ISOTOPE SHIFT MEASUREMENTS, SEE 1994AN14,
179HF2C  1994JI07, 1994ZI04, 1995JI15, 1996ZH35, 1997ZH36, 1999LE11.
179HF CG E,RI,M,MR From 178HF(N,G) E=thermal, unless otherwise specified.
179HF2CG M AND MR ARE FROM EKC AND/OR SUBSHELL RATIOS.
179HF CG E(U)      From 179LU B- decay.
179HF CG E(V)      From 179HF IT DECAY (25.05 D).
179HF CG E(X)      From 178HF(N,G) E=7.78 EV res.
```

```
179HF CG E(z,y),RI(z)$FROM (9BE,A2NG).
179HF CG E(Z),RI(Z)$EG from level energy difference in (N,G) E=thermal. RI is
179HF2CG relative to 100 for strongest transition observed; stronger
179HF3CG transition(s) from level may exist. Transition is deduced from
179HF4CG two-photon cascade data of 1988BO44, assuming that authors' cascade G
179HF5CG order is correct, that cascade G rays are consecutive and that only
179HF6CG two-photon cascades were identified.
179HF CL          Levels from (G,G'), (E,E') with E LE 2310 have been
179HF2CL omitted from ^XREF because their DE is large compared with the
179HF3CL energy spacing of many low-lying levels.
179HF CL E        From LEAST-SQUARES FIT TO EG, ASSIGNING DE=1 KEV TO DATA
179HF2CL FOR WHICH AUTHORS DID NOT STATE UNCERTAINTY, EXCEPT AS NOTED.
179HF CL J        Assignments given without comment are based on
179HF2CL G MULTIPOLARITIES, G DECAY PATTERNS, g-factor analysis,
179HF3CL CALCULATED BANDHEAD ENERGIES AND OBSERVED BAND STRUCTURE
179HF4CL in 176YB(9BE,A2NG)
179HF CL E(R)     DE GT 3 KEV.
179HF CL E(S)     DE GT 10 KEV.
179HF CL J(T)     Fed by primary G from 1/2+ in (N,G) E=thermal; G to 1/2-
179HF2CL and to 7/2-.
179HF CL J(W)     Fed by primary G from 1/2+ in (N,G) E=thermal; G to 1/2-.
179HF CL J(Y)     Fed by primary G from 1/2+ in (N,G) E=thermal.
179HF CL E(Z)     FROM 178HF(D,P), 180HF(D,T).  DE includes a systematic
179HF3CL uncertainty of 0.5 KEV (for E<1700) or 3 KEV (for 1700<E<2050)
179HF4CL combined in quadrature with the relevant statistical DE.
179HF5CL IF NO UNCERTAINTY IS STATED, DE>3 KEV.
179HF CL BAND(A)  9/2[624] GS BAND.
179HF2CL Level spacings perturbed by CORIOLIS mixing (1981TH05). A=11.6, B=3.1.
179HF3CL CONFIG supported by g{-K}(exp)=-0.22 4 cf. -0.245 FROM NILSSON MODEL.
179HF CL J(A)     DEFINITE JPI ASSIGNED TO J LE 23/2 MEMBERS OF 9/2[624] BAND
```

```
179HF2CL BASED ON INDEPENDENTLY ESTABLISHED JPI=9/2+ AND 11/2+ FOR THE GS AND
179HF3CL 123 LEVELS AND MULT=M1+E2 FOR THE INTRABAND 123G CONNECTING THEM.
179HF CL BAND(B)   7/2[514] BAND.
179HF2CL Rotational parameters: A=13.8, B=-3.6.
179HF3CL CONFIG supported by g{-K}(exp)=0.31 4 cf. 0.28 FROM NILSSON MODEL.
179HF CL BAND(D)   1/2[510] BAND.
179HF2CL rotational parameters: A=13.2, B=-5.9, a=+0.16, ^B{-2K}=-3.9.
179HF CL J(D)      DEFINITE JPI ASSIGNED TO J LE 25/2 MEMBERS OF 1/2[510] BAND
179HF2CL BASED ON INDEPENDENTLY ESTABLISHED JPI=1/2- FOR 375 LEVEL AND
179HF3CL MULT=M1+E2 FOR INTRABAND 46G.
179HF CL BAND(E)   5/2[512] BAND.
179HF2CL Rotational parameters: A=14.1, B=-4.2.
179HF3CL CONFIG supported by g{-K}(exp)=-0.27 12 cf. -0.38 FROM NILSSON MODEL.
179HF CL J(E)      DEFINITE JPI ASSIGNED TO J LE 15/2 MEMBERS OF 5/2[512] BAND
179HF2CL BASED ON INDEPENDENTLY ESTABLISHED JPI=5/2- FOR 518 LEVEL AND
179HF3CL MULT=M1+E2 FOR INTRABAND 98G.
179HF CL BAND(F)   1/2[521] BAND.
179HF2CL Rotational parameters: A=13.1, a=+0.67.
179HF CL J(F)      DEFINITE JPI ASSIGNED TO J LE 9/2 MEMBERS OF 1/2[521] BAND
179HF2CL BASED ON INDEPENDENTLY ESTABLISHED JPI=3/2- FOR 680 LEVEL AND
179HF3CL MULT=M1 FOR INTRABAND 148G.
179HF CL BAND(G)   3/2[512] BAND.
179HF CL J(G)      DEFINITE JPI ASSIGNED TO J LE 11/2 MEMBERS OF 3/2[512] BAND
179HF2CL BASED ON INDEPENDENTLY ESTABLISHED JPI=3/2- FOR 721 LEVEL AND
179HF3CL MULT=M1 FOR INTRABAND 147G.
179HF CL BAND(H)   7/2[503] BAND.
179HF2CL Rotational parameters: A=10.5, B=12.3.
179HF CL BAND(I)   KPI=5/2+ GS G-VIBRATIONAL BAND.
179HF CL BAND(J)   7/2[633] BAND.
179HF CL BAND(K)   KPI=9/2+ [9/2[624]+0+] GS B-VIBRATIONAL BAND.
```

```
179HF2CL B vibration (1199(0+) in 178HF) coupled to 9/2[624].
179HF CL BAND(L)   KPI=1/2+ (1/2[510]-1-) BAND.
179HF2CL Octupole vibration (1310(1-) in 178HF) coupled to 1/2[510].
179HF3CL See 1985RI09 for a discussion of unusual decay between octupole and
179HF4CL quadrupole vibrations built on different single-particle states.
179HF5CL Rotational parameters: A=10.9, a=+0.09.
179HF CL BAND(M)   KPI=3/2- [7/2[514]-2+] G-VIBRATIONAL BAND.
179HF2CL Quadrupole vibration (1175(2+) in 178HF) coupled to 7/2[514].
179HF3CL Rotational parameters: A=12.6, B=25.9.
179HF CL BAND(N)   3/2[521] BAND.
179HF CL BAND(O)   3/2[501] BAND.
179HF CL BAND(P)   1/2[501] BAND.
179HF CL BAND(Q)   KPI=3/2+ (1/2[521]+1-) BAND.
179HF2CL Octupole vibration (1310(1-) in 178HF) coupled to 1/2[521].
179HF CL BAND(C)   KPI=17/2+ BAND (2000MU06).
179HF2CL CONFIGURATION=((|n 7/2[514])+(|n 9/2[624])+(|n 1/2][510]))
179HF3CL (2000MU06).
179HF CL BAND(r)   KPI=(21/2+) BAND (2000MU06).
179HF2CL CONFIGURATION=((|n 9/2[624])+(|p 7/2[404])+(|p 5/2][402]))
179HF3CL (2000MU06); SUPPORTED BY g{-K}(exp)=0.54 5 cf. 0.48 FROM NILSSON
MODEL.
179HF CL BAND(s)   KPI=23/2+ BAND (2000MU06).
179HF2CL CONFIGURATION=((|n 7/2[514])+(|p 7/2[404])+(|p 9/2][514]))
179HF3CL (2000MU06); SUPPORTED BY g{-K}(exp)=0.86 20 cf. 0.78 FROM NILSSON
179HF4CL MODEL.
179HF CL BAND(t)   KPI=(19/2-) BAND (2000MU06).
179HF2CL CONFIGURATION=((|n 7/2[514])+(|p 7/2[404])+(|p 5/2][402]))
179HF3CL (2000MU06).
179HF CL BAND(u)   KPI=25/2- BAND (2000MU06).
179HF2CL CONFIGURATION=((|n 9/2[624])+(|p 7/2[404])+(|p 9/2][514]))
```

```
179HF3CL (2000MU06); supported by g{-K}(exp)=0.60 7 cf. 0.55 FROM NILSSON
MODEL.
179HF CL BAND(v)   KPI=(33/2-) BAND (2000MU06).
179HF2CL CONFIGURATION=((|n 7/2[514])+(|n 9/2[624])+(|n 1/2[510])+(|p
7/2[404])+
179HF3CL (|p 9/2][514])) (2000MU06); supported by g{-K}(exp)=0.46 4 cf. 0.45
179HF4CL FROM NILSSON MODEL.
179HF CL BAND(w)   POSSIBLE (|n 5/2[523]) BAND (2000MU06).
179HF2CL DEEXCITES TO 7/2[514] BAND.
179HF  XA178HF(N,G) E=THERMAL
179HF  XB179LU B- DECAY
179HF  XC179HF IT DECAY (18.67 S)
179HF  XD179HF IT DECAY (25.05 D)
179HF  XE178HF(N,G) E=7.78 EV RES
179HF  XFCOULOMB EXCITATION
179HF  XG178HF(D,P), 180HF(D,T)
179HF  XH180HF(3HE,A)
179HF  XI179TA EC DECAY
179HF  XJ179HF(G,G'), (E,E')
179HF  XK176YB(9BE,A2NG),
179HF  XL177HF(T,P)
179HF PN                                                                  6
179HF  L        0.0  9/2+              STABLE                           A
179HFX L XREF=ABCDEFGHIJK
179HF2 L MOMM1=-0.6409 13
179HF3 L MOME2=+3.79  3
179HF CL           DAVRSQ(179HF-178HF)=+0.027 2 (1994AN14), +0.028 3
(1997ZH36),
179HF2CL +0.036 1 (1999LE11, 10% SYSTEMATIC NORMALIZATION UNCERTAINTY NOT
179HF3CL INCLUDED; value is relative to DAVRSQ(178,180)=0.098 as measured
```

```
179HF3CL by 1994ZI04, much higher than DAVRSQ(178,180)=0.075 4 AND 0.076 5
179HF5CL from 1994AN14 and 1997ZH36, respectively). OTHER DAVRSQ: 1994ZI04.
179HF CL            <r{+2}>{+1/2}(CHARGE)=5.3358 24 (2004AN14).
179HF CL MOMM1      Atomic beam (direct) (1989RA17, from 1973BU25).
179HF CL MOME2      Muonic X-RAY hfs (1989RA17, from 1984TA04 and 1983TA14).
179HF2CL Other values: +3.7 7 (reanalysis of atomic beam data of
179HF2CL 1973BU25 quoted in 1985ST28, originally given as
179HF3CL +5.1 5 in 1973BU25); 3.93 5 (1983OL03), +5.3 5 (uncorrected,
1977BU23).
179HF CL J          L(3HE,A)=4 FOR GS AND M1+E2 123G FROM 123 LEVEL (FOR WHICH
179HF2CL L(3HE,A)=6) ESTABLISHES JPI=9/2+ FOR GS AND JPI=11/2+ FOR 123 LEVEL.
179HF3CL GS ASSIGNMENT SUPPORTED BY experimental MOMM1 which is consistent with
179HF4CL theoretical value of -0.6 calculated by evaluator for JPI=9/2+,
179HF5CL 9/2[624]. NILSSON orbital assignment based also on energy systematics
179HF6CL of this orbital in 177YB, 181W, and 183OS (N=107 isotones).
179HF  L  122.7904 24 11/2+            37 PS     3                          A
179HFX L XREF=ABDGHFK
179HF2 L MOME2=1.88 3
179HF CL MOME2      Muonic X-RAY hfs (1989RA17, from 1984TA10).
179HF CL J          SEE COMMENT ON JPI(GS).
179HF CL T          from CE delay (1960BL10) IN COULOMB excitation.
179HF  G    122.793 3     100  M1+E2     -0.27   3     2.18    4
179HF CG MR         from G(|q) in COULOMB EX. Others: 0.309 15 from BE2 and T;
179HF2CG 0.70 +12-11 from EKC in (N,G) E=thermal; 0.22 +20-22 from ELC in Hf
^IT
179HF3CG decay (25.05 D); 0.44 6 from EKC in COULOMB excitation; 0.44 9 from
179HF4CG CEK/CEL in COULOMB EXCITATION.
179HFB G BM1W=0.094 8$BE2W=245 14
179HF CG            BE2W: from measured BE2UP=1.76 10 for 122 LEVEL IN COULOMB
179HF2CG EXCITATION.
```

```
179HF  L  214.3395 22 7/2-              1.85 NS   4                          B
179HFX L XREF=ABCEGKL
179HF CL J          214.3G E1 to 9/2+, 1245G E2 from 3/2-. Spectroscopic factor
179HF2CL in (D,P) is consistent with 7/2-, 7/2[514]. NILSSON orbital assignment
179HF3CL based also on energy systematics of this orbital in 177YB and 181W
179HF4CL (N=107 isotones).
179HF CL T          weighted average of 1.86 NS 5 from 179HF IT DECAY (18.67 S)
179HF2CL and 1.82 NS 10 from (N,G) E=thermal.
179HF  G    214.335 3     100  E1                        0.063   4
179HF CG CC         experimental value from (N,G). Anomalous E1. CC(E1)=0.0494.
179HFB G BE1W=1.110E-5 25
179HF  L   268.92   6 13/2+             21 PS     3                          A
179HFX L XREF=DHFG(269.1)K
179HF CL T          from BE2 IN COULOMB excitation AND ADOPTED TRANSITION
179HF2CL PROPERTIES.
179HF CL J          L=6 in (3HE,A) and (D,P); INTRABAND E2 269G to 9/2+ GS AND
179HF2CL M1+E2 146G TO 11/2+ 123.
179HF  G 146.15     7 100     4 M1+E2     -0.39   4     1.290  22
179HFB G BM1W=0.106 17$BE2W=320 80
179HF CG E,M        from 179HF IT DECAY (25.05 D).
179HF CG RI         from (9BE,A2NG).
179HF CG MR         weighted average of -0.41 5 from G(|q) in COULOMB excitation
179HF2CG and -0.33 8 from G(|q) in Hf ^IT decay (25.05 D). Other: 0.26 +12-26
179HF3CG from EKC in COULOMB ex; inconsistent EKC in 179HF IT DECAY (25.05 D)
179HF4CG may result from contaminated CE line. MR<0.38 from RUL.
179HF  G   268.85  14 39.4    4 E2                        0.1107
179HF CG E,M        from 179HF IT DECAY (25.05 D).
179HF CG RI         from (9BE,A2NG).
179HFB G BE2W=49 6
179HF CG            From BE2UP=0.41 5 IN COULOMB EXCITATION.
```

```
179HF  L  337.7178 23 9/2-                                                B
179HFX L XREF=ABEGHL
179HF CL J         L=5 in (3HE,A); E2 101.3G from 5/2- 476.
179HF2CL Spectroscopic factor in (D,P) is consistent with 9/2-, 7/2[514].
179HF  G  123.3790 20  100    4 E2                      1.582
179HF  G    214.930 3   78    4 [E1]                    0.0491
179HF  G    337.713 5   21.2  9 E1                      0.01607
179HF  L  375.0352 25 1/2-             18.67 S   4                      DM1
179HF2 L %IT=100
179HFX L XREF=ACEGKL
179HF CL J         L=0,1 in (D,P); 160.3G M3 to 7/2- 214. Spectroscopic
179HF2CL factor in (D,P), and band
179HF3CL structure with experimental decoupling constant a=+0.16,
179HF4CL are consistent with 1/2-, 1/2[510]. NILSSON orbital assignment based
179HF5CL also on energy systematics of this orbital in 177YB and 183OS
179HF6CL (N=107 isotones).
179HF CL T         FROM 179HF IT DECAY (18.67 S).
179HF  G    160.696 2     100  M3                       34.1
179HFB G BM3W=0.0364 9
179HF CG RI        FROM 179HF IT DECAY (18.67 S).
179HF  G 375       AP 0.2    AP[M4]                     3.56
179HF CG E,RI      From 179HF IT DECAY (18.67 S).
179HFB G BM4W AP 0.14
179HF  L  420.8943 25 3/2-                                                D
179HFX L XREF=AEGKL
179HF CL J         55.4G M1 from 5/2-; primary G from 1/2+ in (N,G) E=thermal.
179HF2CL Spectroscopic factor in (D,P) is consistent with that for 3/2-,
179HF3CL 1/2[510] level.
179HF  G    45.861010     100  M1+E2     0.11    +0-2  7.7     5
179HF  L     438.68 8 15/2+                                               A
```

```
179HFX L XREF=DFGH
179HF CL E         from 179HF IT DECAY (25.05 D).
179HF CL J         INTRABAND M1+E2 170G TO 13/2+ 269 AND E2 316G
179HF2CL to 11/2+ 123.
179HF  G 169.77    9 96      4 M1+E2     -0.33   5     0.852  17            V
179HF CG RI,M,MR   from 179HF IT DECAY (25.05 D).
179HF  G 315.88    11100       E2                      0.0679               V
179HF CG RI,M      from 179HF IT DECAY (25.05 D).
179HF  L  476.3341 25 5/2-                                                   D
179HFX L XREF=AEGHK
179HF CL J         M1 G to JPI LE 3/2-; L(D,P)=2,3,5. Spectroscopic factor in
179HF2CL (D,P) is consistent with 5/2- 1/2[510].
179HF  G   55.4420 10  100    1M1                     3.74
179HF  G  101.2980 10  90     5E2                     3.35
179HF  G    262.02  3    0.22 6
179HF  L    487.709 5(11/2-)                                                 B
179HFX L XREF=AGKL
179HF CL J         spectroscopic factor in (D,P) is consistent with 11/2-,
179HF2CL 7/2[514]; G rays to 7/2-, 9/2+ and 9/2-; continuation of band BASED ON
179HF3CL JPI=7/2- 214 LEVEL.
179HF  G    150.01915 21.5   15
179HF CG RI        FROM (9BE,A2NG); 30 6 FROM (N,G) E=THERMAL.
179HF  G    273.368 4   100   5
179HF  G    487.70411    52  17
179HF CG           NOT REPORTED IN (9BE,A2NG).
179HF  L  518.3279 24 5/2-             0.2 NS    LT                         E
179HFX L XREF=ABGEK
179HF CL J         97.4G M1+E2 to 3/2- 421, 304.0G M1+E2 to 7/2- 214.
179HF2CL NILSSON orbital assignment based on rotational band structure.
179HF CL T         from 178HF(N,G) E=thermal.
```

```
179HF  G   41.9960 10   0.26  6M1(+E2)    0.13    +6-11 11      3
179HFB G BM1W>0.0023
179HF  G   97.4350 20  0.89   4M1+E2      0.28    +10-144.28    7
179HFB G BM1W>0.00074 $BE2W>0.93
179HF  G  143.301   9   0.11  3(E2)                     0.914
179HFB G BE2W>0.68
179HF CG M         EKC in (N,G) E=thermal consistent with E1 or E2; DPI=no
179HF2CG from level scheme.
179HF  G    180.613 2   0.79  4E2                       0.406
179HFB G BE2W>1.6
179HF  G    303.977 4 100.0  22M1+E2      0.62    +7-6  0.151   5
179HFB G BM1W>0.0021 $BE2W>3.4
179HF  L    582.230 3 7/2-                                                D
179HFX L XREF=AEGK
179HF CL J         105.9G M1 to 5/2- 476; spectroscopic factor in (D,P) is
179HF2CL consistent with 7/2-, 1/2[510]; continuation of band BASED ON JPI=1/2-
179HF3CL 375 LEVEL.
179HF  G  105.899   3 100     2 M1                      3.40
179HF  G  161.3390 20  19.0   8 (E2)                    0.600
179HF  G    367.89117    0.55 9
179HF  L    614.204 3 1/2-             0.50 NS   15                      F
179HFX L XREF=AEG(*)
179HF CL J         M1+E2 193G to 3/2- 421; E2 138G to 5/2- 476. NILSSON orbital
179HF2CL assignment based on rotational band structure with an
179HF3CL experimental decoupling constant of a=+0.67.
179HF CL T         from centroid shift in 178HF(N,G) E=thermal.
179HF  G    137.873 2   0.72  4E2                       1.051
179HFB G BE2W=1.5 5
179HF  G    193.310 2 100.0  21 M1+E2     0.59    4     0.542  11
179HFB G BM1W=0.0025 8$BE2W=10 4
```

```
179HF  G    239.165 3  16.4  12  M1                    0.344
179HFB G BM1W=0.00030 10
179HF  L  616.7562 25 7/2-                                                    E
179HFX L XREF=ABHEG(*)K
179HF CL J         M1+E2 98.4G to 5/2- 518; M1+E2 279.0G to 9/2- 338.
179HF  G   98.433   2 100     1M1+E2     0.35    4     4.14
179HF  G  140.4260 20  10.8   7M1+E2     0.40    +15-191.45    6
179HF  G  195.861   6  2.05  24
179HF  G    279.029 4  75.9   8M1+E2     0.69    +12-110.185  10
179HF CG           I(279G):I(98G)=133 17:100 8 IN (9BE,A2NG).
179HF  G    402.409 6  37.2   7M1+E2     1.28    8     0.0534 18
179HF  G    616.768 9  22.9  19
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