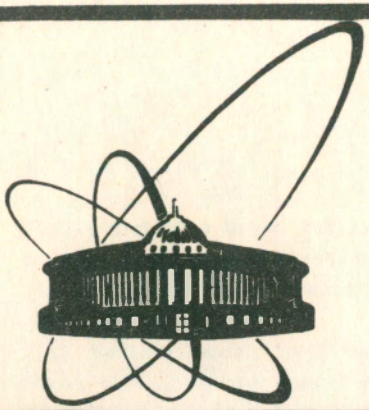

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# ONE NUCLEON TRANSITION DENSITIES FOR 1p SHELL NUCLEI. EXAMPLE: 1h ω EXCITATIONS IN $^{15}$N

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## 1. INTRODUCTION

Evaluation of a broad family of nuclear reaction data on the level of the impulse approximation involves three basic ingredients:
(i) the elementary transition amplitude of the process under consideration;
(ii) nuclear model input on the overlap between the initial and final states of the specific transitions;
(iii) kinematic factors and/or bulk properties of the nucleus.

Systematic studies for a number of nuclear observables over broader mass regions have been made within the bound-state shell model approach (BSM), e.g. for inclusive and partial nuclear excitation functions in the $0\hbar\omega$ and $1\hbar\omega$ band of 1p shell nuclei /Gmi82,83, Gon85, Kis87/, and for energy spectra, transition rates and formfactors within the $0\hbar\omega$ space of 2s,1d nuclei /Bro88/.

For the 1p shell region BSM studies are available for many observables, e.g. for electromagnetic and weak moments, transition rates and formfactors, for the excitation functions of lepton, meson and nucleon scattering, for charge-transfer reactions induced by mesons, nucleons or more complex probes. Recent progress on the experimental facilities now allows to study nuclear reactions with higher beam intensities and resolution. Evaluation of new data from meson factories and high-duty accelerators often requires knowledge of partial transition amplitudes in the excitation and decay of prominent resonances in the excitation functions.

In order to meet the demand for quick on-desk evaluations of reaction data without resorting to shell model codes, we have extracted transition amplitudes from nuclear wave functions which have been verified against a large body of experimental evidence through the 1p shell region.

In sect. 2 we sketch the ingredients of the shell model code, and the definitions of reduced one-nucleon transition density amplitudes (RTDA). We then characterize the nuclear input used and explain the structure of the data output. As an illustration, section 3 presents the RTDA for transitions g.s. -> $1\hbar\omega$ in $^{15}$N for the Millener-Kurath (MK) nuclear hamiltonian /Mil75/.

A Fortran 77 program, that handles our data files easily is to the disposition. These data are currently being used by our colleagues in Dubna, Rez and Moscow. They can be made available on disk to interested users.

## 2. DEFINITIONS AND SHELL MODEL IN/OUTPUT

### 2.1. SHELL MODEL WAVE FUNCTIONS

The many-nucleon shell model wave functions used for calculating transition densities are based on the full nonspurious(0 + 1 hω) basis. We start from the Slater determinants

$$|Sl> = (\Pi c^{+}_{\alpha_1} \ldots c^{+}_{\alpha_A}) \qquad (2.1)$$

built from the single-nucleon states $\alpha = (nljm\tau)$ which span the full (0 + 1 hω) configuration space for the 1p shell region. The eigenfunctions

$$|A;\ EPJT,\ MT_3> = \Sigma\ \beta_i\ |Sl_i> \qquad (2.2)$$

of the nuclear hamiltonian

$$H = T + V \quad \text{--->} \quad H_o + V\ ,$$

$$H_o = \Sigma\ \varepsilon_\alpha\ c^{+}_\alpha c_\alpha\ ,$$

$$V = \tfrac{1}{2}\ \Sigma\ <\alpha\beta|V|\gamma\delta>\ c^{+}_\alpha c^{+}_\beta c_\delta c_\gamma \qquad (2.3)$$

with fixed values of the nucleon number A, total parity P, spin and isospin (JT) and projections ($MT_3$) are constructed from the set (2.1) by subsequent diagonalization of the operators $\bar{J}^2$, $\bar{T}^2$ and H. Further subclassification of the nuclear wave functions may be achieved by extending the chain of operators to be diagonalized. Center-of-mass spuriosity has always been removed.

### 2.2. CONVENTION FOR THE SINGLE-NUCLEON STATES

For the s.p. basis states $\alpha$ we adopt the conventions:

(1) radial shape: spherical oscillator functions $R_{nl}(r)$ with R(r) positive for r --> 0; (2.4)

(2) order of coupling of the nucleonic orbital angular momentum l and intrinsic spin s is (ls|j), i.e.

$$|nljm\tau> = R_{nl}(r) \; \Sigma \; (lm_l, \tfrac{1}{2}m_s|jm) \; Y_{lm_l}(\Omega) \; \chi_{m_s} \; \xi_\tau . \qquad (2.5)$$

## 2.3. SHELL MODEL INPUT

The shell-model wave functions for 1p shell nuclei have been generated using various options for the effective interaction:

(1) For 0hω states we adopt either the two-body matrix elements from Cohen-Kurath /Coh65/ version (8-16)2BME (in the following: CK), or the set of Van Hees /Hee83/ (in the following: VH);

(2) For the states in the 1hω band we have used three versions:
(i) a modified Gillet-COP interaction /Jae77/ (the "standard interaction" of ref. /Gmi82,83, Kis87/;
(ii) the Millener-Kurath interaction /Mil75/ (MK);
(iii) the interaction given by van Hees (VH).

In this context we note only that the MK version improves over the Gillet version concerning the low-lying spectra of opposite-parity states, and correctly reproduces the inversion of the s.p. level ordering when moving from $^{15}$N to $^{17}$O. The MK hamiltonian contains a small noncentral component as compared with the central interactions from the earlier literature. There is no serious difference between the BSM(1hω) results for the MK and Gillet version in the giant resonance region of excitation functions (see e.g. /Kis87/). The VH interaction version has been obtained by fitting the bulk of well established levels of both normal and anomal parity through the mass region A = 4 to 16, using a translationally invariant interaction. It reproduces the main features for 1p shell nuclei fairly well.For a full characterization of the adopted hamiltonians we refer to the original literature /Coh65, Mil75, Jae77, Hee83/. The results with the VH interaction through the 1p shell region have been discussed in detail by /Hee83,84/.

## 2.4. REDUCED TRANSITION DENSITY AMPLITUDES (RTDA)

The matrix element of any one-particle operator $O$

$$O = \Sigma \langle\beta|O|\alpha\rangle \, c^{+}_{\beta} c_{\alpha} \ , \quad \alpha = (nljm\tau) \tag{2.6}$$

between many-particle states $|i\rangle = |E_i J_i T_i\rangle$ and $|f\rangle = |E_f J_f T_f\rangle$ can be factorized as follows /Tia84/:

$$\langle E_f J_f T_f|||O(JT)|||E_i J_i T_i\rangle = \sum_{a'a} \Psi_{JT}(a'a) \, \langle a'|||O(JT)|||a\rangle \ , \tag{2.7}$$

where $a = (nlj)$, $(JT)$ are the tensorial ranks of the operator in the space and isospace, and the triple bar means reduction in both space and isospace.

The one-body density matrices are defined by

$$\Psi_{JT}(a'a) = \langle E_f J_f T_f||| \, [c^{+}(a')\tilde{c}(a)]_{JT} \, |||E_i J_i T_i\rangle \, * \\ * \, (2J+1)^{-1/2} \, (2T+1)^{-1/2} \ , \tag{2.8}$$

where $\tilde{c}(nljm\tau) = (-1)^{j-m+\frac{1}{2}-\tau} \, c(nlj-m-\tau)$. The reduced matrix elements are defined according to the convention of deShalit and Talmi /deS62/, i.e.:

$$\langle J_f M_f| \, O(JM) \, |J_i M_i\rangle = (2J_f+1)^{-1/2} \, \langle J_f|| \, O(J) \, ||J_i\rangle \, * \\ * \, (J_i M_i, JM|J_f M_f) \ . \tag{2.9}$$

The s.p. matrix elements $O_{a'a}$ between the active nucleon orbits carry the information on the elementary amplitude of the specific process.

In the $0h\omega$ space of 1p shell nuclei the following one-particle transitions a'<--a enter the sum (2.7):

$$p_{3/2}\text{<--}p_{3/2}, \quad p_{3/2}\text{<--}p_{3/2}, \quad p_{1/2}\text{<--}p_{3/2}, \quad p_{1/2}\text{<--}p_{1/2}, \quad 1s\text{<--}1s \tag{2.10}$$

In the excitations from the ground state of 1p shell nuclei to states of the $1h\omega$ band the following one-particle orbits

contribute:

(1) valence nucleon transitions

$d_{5/2}$<--$p_{3/2}$, 2s<--$p_{3/2}$, $d_{3/2}$<--$p_{3/2}$,
$d_{5/2}$<--$p_{1/2}$, 2s<--$p_{1/2}$, $d_{3/2}$<--$p_{1/2}$; (2.11a)

(2) 1s core excitations

$p_{3/2}$<--1s, $p_{1/2}$<--1s. (2.11b)

## 2.5. ORGANIZATION OF THE TABLES OF RTDA

For users convenience the available BSM (0hω + 1hω) results for RTDA for 1p shell nuclei can be made available on tape or disk. The file structure of these data is as follows:

1. text identifier (nucleus, interaction, configuration space);

2. for each group ($J_f T_f$) and multipolarity (JT):
   -- 6 integers : $2*J_f$, $2*T_f$, parity of transition operator (+1 or -1), N (# of states in the group $J_f T_f$), multipolarities J and T;
   -- N lines of table, each containing:
   running index f, energy $E_f$, 5 (8) numbers RTDA(g.s.-->f), depending on the parity of the transition operator (1 for 0hω, -1 for 1hω excitations).

The sequence of the columns RTDA(g.s.-->f; 1 to 5 (8)) on the output LPT/disk is as follows:

For 0hω final states:
p3<-p3 p1<-p3 p3<-p1 p3<-p3 1s<-1s (p3 $\hat{=}$ $p_{3/2}$ etc.)

For 1hω final states:
d5<-p3 2s<-p3 d3<-p3 d5<-p1 2s<-p1 d3<-p1 p3<-1s p1<-1s .

Table 1

NUCLEAR REDUCED DENSITY MATRICES FOR 15N. TRANSITIONS G.S. TO 1HO. MILLENER-KURATH

| Jf | Tf | Par | No | J | T |
|---|---|---|---|---|---|
| 1 | 1 | -1 | 16 | 1 | 0 |

| | Energy | 1d5<-1p3 | 2s1<-1p3 | 1d3<-1p3 | 1d5<-1p1 | 2s1<-1p1 | 1d3<-1p1 | 1p3<-1s1 | 1p1<-1s1 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.96 | 0.000+00 | 1.083-01 | -3.392-01 | 4.058-01 | 3.176-02 | 0.000+00 | 9.489-01 | -1.523-01 |
| 2 | 8.44 | 0.000+00 | -2.344-02 | -1.156-01 | 6.768-03 | 2.291-02 | 0.000+00 | 3.813-01 | -2.227-02 |
| 3 | 12.50 | 0.000+00 | -9.609-02 | -1.288-01 | 6.144-02 | 6.368-02 | 0.000+00 | 3.205-01 | -3.356-02 |
| 4 | 15.54 | 0.000+00 | -5.180-02 | -3.230-01 | 8.558-01 | 2.213-01 | 0.000+00 | -3.539-01 | 1.210-01 |
| 5 | 16.16 | 0.000+00 | -6.939-03 | -2.811-01 | -2.925-01 | 1.385-01 | 0.000+00 | 2.066-01 | 5.279-01 |
| 6 | 18.92 | 0.000+00 | -2.035-02 | 2.769-01 | -2.101-03 | 2.524-01 | 0.000+00 | 5.564-02 | -2.934-01 |
| 7 | 21.04 | 0.000+00 | 5.656-02 | 1.222-01 | 5.479-02 | -1.511-01 | 0.000+00 | 2.954-02 | -2.484-01 |
| 8 | 22.25 | 0.000+00 | 4.203-02 | 3.611-02 | -6.194-02 | -2.933-01 | 0.000+00 | 5.046-02 | -1.400-01 |
| 9 | 23.01 | 0.000+00 | -5.624-02 | -2.395-01 | 1.894-01 | -2.297-01 | 0.000+00 | -2.223-01 | 1.675-01 |
| 10 | 24.64 | 0.000+00 | -2.610-01 | -5.059-02 | 1.017-01 | -7.152-03 | 0.000+00 | -1.067-01 | -9.491-02 |
| 11 | 24.83 | 0.000+00 | 1.002-01 | 2.061-01 | 3.048-01 | 3.605-01 | 0.000+00 | -3.305-01 | -1.054-01 |
| 12 | 26.05 | 0.000+00 | -1.337-01 | -1.593-02 | -7.266-02 | 5.793-02 | 0.000+00 | 1.328-01 | -3.937-02 |
| 13 | 27.95 | 0.000+00 | 1.873-02 | -2.289-01 | 1.093-01 | -7.794-01 | 0.000+00 | -1.672-01 | -2.556-02 |
| 14 | 30.15 | 0.000+00 | 2.324-01 | 9.040-02 | -4.110-03 | 3.819-01 | 0.000+00 | 6.532-02 | 1.502-01 |
| 15 | 31.92 | 0.000+00 | 4.252-01 | 8.860-02 | 4.083-05 | -7.081-02 | 0.000+00 | 1.922-02 | 7.375-02 |
| 16 | 34.52 | 0.000+00 | 6.603-01 | 1.727-01 | 7.728-02 | -4.155-02 | 0.000+00 | -2.368-03 | 6.353-02 |

Table 1 (continue)

| Jf | Tf | Par | No | J | T |
|---|---|---|---|---|---|
| 1 | 1 | -1 | 16 | 1 | 1 |

| | Energy | 1d5<-1p3 | 2s1<-1p3 | 1d3<-1p3 | 1d5<-1p1 | 2s1<-1p1 | 1d3<-1p1 | 1p3<-1s1 | 1p1<-1s1 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 5.96 | 0.000+00 | -1.083-01 | 3.337-02 | 1.694-01 | 9.449-03 | 0.000+00 | -2.818-01 | -1.523-01 |
| 2 | 8.44 | 0.000+00 | 2.344-02 | -3.489-02 | -1.774-01 | -3.229-02 | 0.000+00 | 3.904-01 | -2.227-02 |
| 3 | 12.50 | 0.000+00 | 9.609-02 | 7.691-02 | -4.778-01 | -9.395-02 | 0.000+00 | -2.362-01 | -3.356-02 |
| 4 | 15.54 | 0.000+00 | 5.180-02 | -1.194-01 | 6.514-02 | 3.257-02 | 0.000+00 | 9.366-02 | 1.210-01 |
| 5 | 16.16 | 0.000+00 | 6.939-03 | -2.779-01 | -5.048-02 | 2.435-01 | 0.000+00 | -8.257-02 | 5.279-01 |
| 6 | 18.92 | 0.000+00 | 2.035-02 | -6.106-03 | -3.177-02 | 2.970-01 | 0.000+00 | 4.145-03 | -2.934-01 |
| 7 | 21.04 | 0.000+00 | -5.656-02 | -2.787-01 | 6.049-03 | 6.505-02 | 0.000+00 | -2.507-02 | -2.484-01 |
| 8 | 22.25 | 0.000+00 | -4.203-02 | -4.863-01 | -1.337-02 | -1.944-01 | 0.000+00 | -3.979-02 | -1.400-01 |
| 9 | 23.01 | 0.000+00 | 5.624-02 | 5.969-02 | -1.208-01 | -2.371-01 | 0.000+00 | 6.272-02 | 1.675-01 |
| 10 | 24.64 | 0.000+00 | 2.610-01 | -8.093-02 | 9.721-02 | -2.606-02 | 0.000+00 | 4.345-02 | -9.491-02 |
| 11 | 24.83 | 0.000+00 | -1.002-01 | -9.613-02 | -2.602-01 | 5.696-02 | 0.000+00 | 6.680-02 | -1.054-01 |
| 12 | 26.05 | 0.000+00 | 1.337-01 | -5.482-02 | -1.635-01 | -4.880-02 | 0.000+00 | -1.051-01 | -3.937-02 |
| 13 | 27.95 | 0.000+00 | -1.873-02 | 8.702-02 | -6.464-02 | 2.664-01 | 0.000+00 | 3.983-02 | -2.556-02 |
| 14 | 30.15 | 0.000+00 | -2.324-01 | -6.966-03 | 5.082-02 | 6.031-02 | 0.000+00 | -6.787-03 | 1.502-01 |
| 15 | 31.92 | 0.000+00 | -4.252-01 | 2.293-02 | 4.383-02 | -1.943-01 | 0.000+00 | 1.316-03 | 7.375-02 |
| 16 | 34.52 | 0.000+00 | -6.603-01 | 8.642-03 | -3.171-02 | -8.536-02 | 0.000+00 | 1.019-03 | 6.353-02 |

Table 1 (continue)

| Jf | Tf | Par | No | J | T |
|---|---|---|---|---|---|
| 3 | 1 | -1 | 23 | 1 | 0 |

| | Energy | 1d5<-1p3 | 2s1<-1p3 | 1d3<-1p3 | 1d5<-1p1 | 2s1<-1p1 | 1d3<-1p1 | 1p3<-1s1 | 1p1<-1s1 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.99 | 0.000+00 | 0.000+00 | 3.763-01 | -5.735-01 | -3.950-02 | 0.000+00 | -9.532-01 | 2.665-01 |
| 2 | 10.09 | 0.000+00 | 0.000+00 | -1.505-01 | 2.573-02 | 3.471-02 | 0.000+00 | 2.709-02 | 1.891-01 |
| 3 | 11.18 | 0.000+00 | 0.000+00 | -9.136-02 | 1.593-01 | -3.452-02 | 0.000+00 | 1.923-01 | -7.960-02 |
| 4 | 12.54 | 0.000+00 | 0.000+00 | 1.390-01 | -8.111-02 | 2.031-02 | 0.000+00 | -2.137-01 | -3.053-02 |
| 5 | 14.90 | 0.000+00 | 0.000+00 | 3.193-01 | -1.092+00 | -1.388-01 | 0.000+00 | 3.830-01 | 2.876-02 |
| 6 | 14.95 | 0.000+00 | 0.000+00 | 3.552-01 | -7.103-01 | -2.079-01 | 0.000+00 | 2.074-01 | -2.130-01 |
| 7 | 15.55 | 0.000+00 | 0.000+00 | 2.516-03 | 2.496-01 | -1.564-01 | 0.000+00 | -1.316-01 | -1.732-01 |
| 8 | 16.07 | 0.000+00 | 0.000+00 | 5.831-01 | 2.704-01 | -2.451-01 | 0.000+00 | -1.101-01 | -1.014+00 |
| 9 | 16.74 | 0.000+00 | 0.000+00 | -1.943-01 | -8.474-02 | 1.572-02 | 0.000+00 | 1.268-01 | 2.646-01 |
| 10 | 17.74 | 0.000+00 | 0.000+00 | -1.572-03 | 1.591-01 | -8.603-02 | 0.000+00 | -4.461-02 | -1.170-01 |
| 11 | 18.12 | 0.000+00 | 0.000+00 | 1.804-01 | 3.778-02 | -3.252-02 | 0.000+00 | 9.096-02 | -3.212-01 |
| 12 | 20.17 | 0.000+00 | 0.000+00 | 5.913-03 | -4.353-02 | -3.061-01 | 0.000+00 | 9.798-02 | -1.611-01 |
| 13 | 22.07 | 0.000+00 | 0.000+00 | 2.752-01 | -1.651-01 | 5.590-01 | 0.000+00 | 1.038-01 | -6.122-02 |
| 14 | 22.96 | 0.000+00 | 0.000+00 | -1.695-01 | -5.515-02 | -3.596-01 | 0.000+00 | 2.445-03 | 1.003-01 |
| 15 | 23.38 | 0.000+00 | 0.000+00 | -1.001-01 | 1.520-01 | 3.635-02 | 0.000+00 | -1.083-01 | 1.029-01 |
| 16 | 24.59 | 0.000+00 | 0.000+00 | 2.649-01 | -3.614-02 | 9.163-01 | 0.000+00 | 7.932-02 | 4.173-02 |
| 17 | 25.71 | 0.000+00 | 0.000+00 | -1.455-01 | 4.632-02 | -2.646-01 | 0.000+00 | -7.480-02 | 8.101-02 |
| 18 | 25.97 | 0.000+00 | 0.000+00 | -1.777-01 | 1.503-02 | -5.128-01 | 0.000+00 | -4.766-02 | 2.083-02 |
| 19 | 26.70 | 0.000+00 | 0.000+00 | 5.747-02 | 4.995-02 | 1.209-01 | 0.000+00 | -2.856-02 | -4.188-02 |
| 20 | 27.11 | 0.000+00 | 0.000+00 | 2.727-01 | 1.858-01 | 5.392-01 | 0.000+00 | -9.353-02 | -2.004-01 |
| 21 | 29.13 | 0.000+00 | 0.000+00 | 2.442-01 | 4.186-02 | -2.657-01 | 0.000+00 | -2.071-02 | -4.637-01 |
| 22 | 30.83 | 0.000+00 | 0.000+00 | -1.899-01 | -1.411-02 | -4.617-01 | 0.000+00 | -1.130-02 | 6.235-02 |
| 23 | 32.24 | 0.000+00 | 0.000+00 | -5.722-02 | 2.100-02 | 5.146-04 | 0.000+00 | 3.970-03 | 6.195-02 |

Table 1 (continue)

| Jf | Tf | Par | No | J | T |
|---|---|---|---|---|---|
| 3 | 1 | -1 | 23 | 1 | 1 |

| | Energy | 1d5<-1p3 | 2s1<-1p3 | 1d3<-1p3 | 1d5<-1p1 | 2s1<-1p1 | 1d3<-1p1 | 1p3<-1s1 | 1p1<-1s1 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.99 | 0.000+00 | 0.000+00 | 1.797-01 | -1.414-03 | 2.913-03 | 0.000+00 | -9.532-01 | -3.253-03 |
| 2 | 10.09 | 0.000+00 | 0.000+00 | 1.283-01 | 3.528-02 | -7.990-02 | 0.000+00 | 2.709-02 | -2.706-01 |
| 3 | 11.18 | 0.000+00 | 0.000+00 | 3.746-01 | -9.013-03 | -1.856-01 | 0.000+00 | 1.923-01 | -4.209-01 |
| 4 | 12.54 | 0.000+00 | 0.000+00 | 4.878-02 | 2.312-01 | -4.378-02 | 0.000+00 | -2.137-01 | -1.182-01 |
| 5 | 14.90 | 0.000+00 | 0.000+00 | 9.105-02 | -3.821-01 | -1.347-02 | 0.000+00 | 3.830-01 | 1.649-01 |
| 6 | 14.95 | 0.000+00 | 0.000+00 | -2.141-01 | 2.377-01 | -1.734-01 | 0.000+00 | 2.074-01 | -4.493-01 |
| 7 | 15.55 | 0.000+00 | 0.000+00 | 4.963-02 | -4.486-01 | -1.176-01 | 0.000+00 | -1.316-01 | -4.165-01 |
| 8 | 16.07 | 0.000+00 | 0.000+00 | 7.854-02 | 8.900-02 | -1.546-01 | 0.000+00 | -1.101-01 | -9.748-02 |
| 9 | 16.74 | 0.000+00 | 0.000+00 | 2.672-01 | 2.913-01 | -6.251-02 | 0.000+00 | 1.268-01 | -7.920-02 |
| 10 | 17.74 | 0.000+00 | 0.000+00 | 2.689-01 | -4.200-01 | 1.005-02 | 0.000+00 | -4.481-02 | 5.004-02 |
| 11 | 18.12 | 0.000+00 | 0.000+00 | 3.070-01 | 1.387-01 | 1.953-01 | 0.000+00 | 9.096-02 | -2.058-01 |
| 12 | 20.17 | 0.000+00 | 0.000+00 | 4.426-01 | 1.840-01 | 1.208-01 | 0.000+00 | 9.798-02 | 3.585-01 |
| 13 | 22.07 | 0.000+00 | 0.000+00 | 1.385-01 | -9.305-03 | -1.958-02 | 0.000+00 | 1.038-01 | 3.665-02 |
| 14 | 22.96 | 0.000+00 | 0.000+00 | -4.884-02 | 1.819-01 | -6.232-01 | 0.000+00 | 2.445-03 | 2.515-01 |
| 15 | 23.38 | 0.000+00 | 0.000+00 | 1.201-01 | -1.555-01 | -3.957-01 | 0.000+00 | -1.083-01 | 1.091-01 |
| 16 | 24.59 | 0.000+00 | 0.000+00 | 2.763-01 | 9.203-02 | -1.142-01 | 0.000+00 | 7.932-02 | 9.722-02 |
| 17 | 25.71 | 0.000+00 | 0.000+00 | 9.127-02 | 1.084-01 | 6.651-02 | 0.000+00 | -7.480-02 | -1.796-02 |
| 18 | 25.97 | 0.000+00 | 0.000+00 | 5.312-02 | 1.176-02 | 1.031-02 | 0.000+00 | -4.766-02 | 5.118-02 |
| 19 | 26.70 | 0.000+00 | 0.000+00 | -9.570-02 | 4.019-02 | -2.265-01 | 0.000+00 | -2.856-02 | 9.755-02 |
| 20 | 27.11 | 0.000+00 | 0.000+00 | -2.062-01 | 4.027-02 | 1.011-01 | 0.000+00 | -9.353-02 | -2.862-02 |
| 21 | 29.13 | 0.000+00 | 0.000+00 | -1.214-01 | -3.394-02 | 2.522-02 | 0.000+00 | -2.071-02 | 8.439-02 |
| 22 | 30.83 | 0.000+00 | 0.000+00 | 7.901-02 | 2.832-02 | 2.039-01 | 0.000+00 | -1.130-02 | -2.882-02 |
| 23 | 32.24 | 0.000+00 | 0.000+00 | 6.899-02 | -2.080-02 | -7.332-02 | 0.000+00 | 3.970-03 | 1.606-01 |

Table 1 (continue)

| Jf | Tf | Par | No | J | T |
|---|---|---|---|---|---|
| 3 | 1 | -1 | 23 | 2 | 0 |

| | Energy | 1d5<-1p3 | 2s1<-1p3 | 1d3<-1p3 | 1d5<-1p1 | 2s1<-1p1 | 1d3<-1p1 | 1p3<-1s1 | 1p1<-1s1 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.99 | 0.000+00 | 0.000+00 | 5.191-02 | -9.659-02 | -1.733-02 | -4.308-02 | 0.000+00 | 1.638-01 |
| 2 | 10.09 | 0.000+00 | 0.000+00 | 3.021-01 | 6.795-02 | -6.605-02 | 7.044-01 | 0.000+00 | 4.382-01 |
| 3 | 11.18 | 0.000+00 | 0.000+00 | 2.690-01 | -3.815-02 | -2.060-01 | -4.623-01 | 0.000+00 | 4.573-01 |
| 4 | 12.54 | 0.000+00 | 0.000+00 | -4.444-02 | 3.571-01 | -9.670-02 | -1.310-01 | 0.000+00 | 1.235-01 |
| 5 | 14.90 | 0.000+00 | 0.000+00 | -1.359-01 | 2.750-01 | 1.101-01 | -1.466-02 | 0.000+00 | -1.807-01 |
| 6 | 14.95 | 0.000+00 | 0.000+00 | 1.766-01 | -2.270-01 | -2.524-01 | 6.615-02 | 0.000+00 | 4.114-01 |
| 7 | 15.55 | 0.000+00 | 0.000+00 | -2.701-01 | 3.216-01 | 1.298-02 | 8.782-02 | 0.000+00 | 3.959-01 |
| 8 | 16.07 | 0.000+00 | 0.000+00 | -3.627-01 | -5.021-02 | 7.026-02 | 1.399-01 | 0.000+00 | -4.912-01 |
| 9 | 16.74 | 0.000+00 | 0.000+00 | -9.320-01 | -7.764-02 | 1.509-01 | 5.466-02 | 0.000+00 | 2.538-01 |
| 10 | 17.74 | 0.000+00 | 0.000+00 | 5.619-02 | -7.957-01 | -7.918-02 | 5.542-02 | 0.000+00 | -1.303-01 |
| 11 | 18.12 | 0.000+00 | 0.000+00 | 3.465-01 | 1.409-01 | 4.332-01 | -6.681-02 | 0.000+00 | 5.427-02 |
| 12 | 20.17 | 0.000+00 | 0.000+00 | 2.653-01 | 2.853-01 | -3.338-01 | 1.301-01 | 0.000+00 | -5.245-01 |
| 13 | 22.07 | 0.000+00 | 0.000+00 | -1.069-01 | -1.812-01 | 1.126-01 | -1.167-02 | 0.000+00 | -8.071-02 |
| 14 | 22.96 | 0.000+00 | 0.000+00 | 1.224-01 | -2.933-01 | 1.236-01 | -3.288-02 | 0.000+00 | -2.417-01 |
| 15 | 23.38 | 0.000+00 | 0.000+00 | 6.744-02 | 5.433-01 | 2.604-01 | 1.577-03 | 0.000+00 | -6.921-02 |
| 16 | 24.59 | 0.000+00 | 0.000+00 | -7.874-03 | -8.794-02 | -1.671-01 | 8.092-02 | 0.000+00 | -9.163-02 |
| 17 | 25.71 | 0.000+00 | 0.000+00 | 7.429-02 | -1.127-01 | 4.281-01 | 1.808-02 | 0.000+00 | 7.018-02 |
| 18 | 25.97 | 0.000+00 | 0.000+00 | -2.124-01 | 7.843-02 | -7.340-01 | -2.759-02 | 0.000+00 | -4.892-02 |
| 19 | 26.70 | 0.000+00 | 0.000+00 | 1.432-01 | 8.914-02 | 1.599-01 | -1.097-02 | 0.000+00 | -1.422-01 |
| 20 | 27.11 | 0.000+00 | 0.000+00 | -2.413-02 | 1.565-01 | -3.076-01 | -3.833-02 | 0.000+00 | -8.592-02 |
| 21 | 29.13 | 0.000+00 | 0.000+00 | 8.019-02 | 1.358-02 | 7.718-02 | 2.369-02 | 0.000+00 | -3.795-01 |
| 22 | 30.83 | 0.000+00 | 0.000+00 | -7.840-02 | 1.290-02 | 5.024-02 | -3.072-03 | 0.000+00 | 7.200-02 |
| 23 | 32.24 | 0.000+00 | 0.000+00 | -6.701-03 | 3.462-02 | -2.671-01 | 2.791-02 | 0.000+00 | -1.555-01 |

Table 1 (continue)

| Jf | Tf | Par | No | J | T |
|---|---|---|---|---|---|
| 3 | 1 | -1 | 23 | 2 | 1 |

| | Energy | 1d5<-1p3 | 2s1<-1p3 | 1d3<-1p3 | 1d5<-1p1 | 2s1<-1p1 | 1d3<-1p1 | 1p3<-1s1 | 1p1<-1s1 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.99 | 0.000+00 | 0.000+00 | 5.751-02 | -1.545-01 | 9.143-04 | -4.308-02 | 0.000+00 | -1.059-01 |
| 2 | 10.09 | 0.000+00 | 0.000+00 | 1.798-01 | 9.298-02 | 1.692-02 | 7.044-01 | 0.000+00 | -2.152-02 |
| 3 | 11.18 | 0.000+00 | 0.000+00 | 2.205-01 | -4.174-02 | -1.685-01 | -4.623-01 | 0.000+00 | 1.160-01 |
| 4 | 12.54 | 0.000+00 | 0.000+00 | -1.119-01 | 5.764-01 | 2.383-02 | -1.310-01 | 0.000+00 | 3.585-02 |
| 5 | 14.90 | 0.000+00 | 0.000+00 | 1.576-01 | 1.297-01 | 8.334-03 | -1.466-02 | 0.000+00 | -4.449-02 |
| 6 | 14.95 | 0.000+00 | 0.000+00 | -2.273-01 | -9.789-02 | -2.155-02 | 6.615-02 | 0.000+00 | 1.751-01 |
| 7 | 15.55 | 0.000+00 | 0.000+00 | -3.031-01 | -3.102-02 | -1.354-01 | 8.782-02 | 0.000+00 | 1.526-01 |
| 8 | 16.07 | 0.000+00 | 0.000+00 | 2.371-01 | -6.246-03 | -1.010-01 | 1.399-01 | 0.000+00 | 4.250-01 |
| 9 | 16.74 | 0.000+00 | 0.000+00 | -7.090-02 | -7.880-02 | 8.003-02 | 5.466-02 | 0.000+00 | -8.999-02 |
| 10 | 17.74 | 0.000+00 | 0.000+00 | -1.481-01 | 2.237-01 | 8.265-02 | 5.542-02 | 0.000+00 | 3.680-02 |
| 11 | 18.12 | 0.000+00 | 0.000+00 | -8.108-02 | -5.739-02 | 4.159-01 | -6.681-02 | 0.000+00 | 1.696-01 |
| 12 | 20.17 | 0.000+00 | 0.000+00 | -2.839-01 | -1.157-01 | -1.845-01 | 1.301-01 | 0.000+00 | -6.855-03 |
| 13 | 22.07 | 0.000+00 | 0.000+00 | -2.313-01 | -2.124-02 | 7.501-03 | -1.167-02 | 0.000+00 | 1.716-02 |
| 14 | 22.96 | 0.000+00 | 0.000+00 | -8.722-02 | 6.374-02 | 5.505-02 | -3.288-02 | 0.000+00 | -9.044-02 |
| 15 | 23.38 | 0.000+00 | 0.000+00 | -3.689-02 | -6.613-02 | 7.776-02 | 1.577-03 | 0.000+00 | -6.299-02 |
| 16 | 24.59 | 0.000+00 | 0.000+00 | 1.217-01 | 4.862-02 | -2.369-02 | 8.092-02 | 0.000+00 | -3.614-02 |
| 17 | 25.71 | 0.000+00 | 0.000+00 | 9.979-03 | 1.818-01 | -1.155-01 | 1.808-02 | 0.000+00 | -2.881-02 |
| 18 | 25.97 | 0.000+00 | 0.000+00 | 9.136-02 | 5.346-02 | 2.970-01 | -2.759-02 | 0.000+00 | -1.857-02 |
| 19 | 26.70 | 0.000+00 | 0.000+00 | -2.221-02 | 3.293-02 | -4.668-02 | -1.097-02 | 0.000+00 | -2.757-03 |
| 20 | 27.11 | 0.000+00 | 0.000+00 | -1.036-01 | 8.730-02 | 1.853-03 | -3.833-02 | 0.000+00 | 8.590-02 |
| 21 | 29.13 | 0.000+00 | 0.000+00 | 8.262-03 | -2.204-02 | 1.058-01 | 2.369-02 | 0.000+00 | 1.686-01 |
| 22 | 30.83 | 0.000+00 | 0.000+00 | 2.721-02 | 3.430-02 | -6.363-02 | -3.072-03 | 0.000+00 | -1.918-02 |
| 23 | 32.24 | 0.000+00 | 0.000+00 | 5.388-03 | -1.133-02 | -1.930-01 | 2.791-02 | 0.000+00 | -5.689-02 |

Table 1 (continue)

| Jf | Tf | Par | No | J | T |
|---|---|---|---|---|---|
| 5 | 1 | -1 | 21 | 2 | 0 |

| | Energy | 1d5<-1p3 | 2s1<-1p3 | 1d3<-1p3 | 1d5<-1p1 | 2s1<-1p1 | 1d3<-1p1 | 1p3<-1s1 | 1p1<-1s1 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.26 | 0.000+00 | 0.000+00 | 7.705-02 | 4.548-02 | 6.140-03 | 6.148-01 | 0.000+00 | 2.676-02 |
| 2 | 8.35 | 0.000+00 | 0.000+00 | -3.364-01 | -4.112-02 | 1.614-02 | -9.061-01 | 0.000+00 | -1.670-01 |
| 3 | 12.30 | 0.000+00 | 0.000+00 | -4.225-01 | 2.225-01 | 1.289-02 | -2.242-01 | 0.000+00 | -5.892-01 |
| 4 | 13.21 | 0.000+00 | 0.000+00 | -1.286-01 | -2.577-01 | 1.665-01 | 1.466-01 | 0.000+00 | -7.197-01 |
| 5 | 13.57 | 0.000+00 | 0.000+00 | -3.891-03 | 3.428-01 | 8.562-02 | 7.279-01 | 0.000+00 | -2.020-01 |
| 6 | 14.60 | 0.000+00 | 0.000+00 | 3.804-01 | 1.939-01 | -3.630-03 | -2.628-01 | 0.000+00 | 2.541-01 |
| 7 | 15.70 | 0.000+00 | 0.000+00 | 1.171+00 | -4.870-01 | -2.899-01 | -9.438-02 | 0.000+00 | -3.172-01 |
| 8 | 16.47 | 0.000+00 | 0.000+00 | -9.155-02 | 4.008-01 | 2.695-01 | -6.400-03 | 0.000+00 | -7.967-02 |
| 9 | 17.08 | 0.000+00 | 0.000+00 | 3.913-01 | 9.127-01 | -1.685-01 | -2.650-01 | 0.000+00 | -3.545-02 |
| 10 | 18.27 | 0.000+00 | 0.000+00 | -4.841-01 | -4.854-01 | 3.417-02 | 9.165-03 | 0.000+00 | 2.593-01 |
| 11 | 19.80 | 0.000+00 | 0.000+00 | -7.632-02 | -2.657-01 | -7.091-01 | -4.022-03 | 0.000+00 | 6.709-03 |
| 12 | 21.30 | 0.000+00 | 0.000+00 | -1.348-01 | 5.553-01 | -8.359-01 | 6.175-02 | 0.000+00 | -4.051-02 |
| 13 | 22.05 | 0.000+00 | 0.000+00 | 7.829-02 | 2.334-02 | -5.751-02 | -1.819-01 | 0.000+00 | 4.188-02 |
| 14 | 22.59 | 0.000+00 | 0.000+00 | -1.918-01 | -2.540-01 | -6.882-01 | 3.598-02 | 0.000+00 | -6.353-02 |
| 15 | 23.40 | 0.000+00 | 0.000+00 | 2.143-01 | 4.200-02 | 4.755-01 | -3.434-01 | 0.000+00 | 5.839-04 |
| 16 | 25.81 | 0.000+00 | 0.000+00 | -5.557-02 | -2.164-01 | -2.766-01 | -1.822-01 | 0.000+00 | -8.931-03 |
| 17 | 26.69 | 0.000+00 | 0.000+00 | -3.562-02 | -1.799-01 | 4.038-02 | 1.839-01 | 0.000+00 | -4.182-02 |
| 18 | 27.29 | 0.000+00 | 0.000+00 | -5.707-02 | 2.603-01 | -2.175-01 | -5.067-02 | 0.000+00 | -2.123-02 |
| 19 | 27.89 | 0.000+00 | 0.000+00 | -2.418-02 | 1.407-01 | 1.693-01 | 1.531-01 | 0.000+00 | -3.084-02 |
| 20 | 30.64 | 0.000+00 | 0.000+00 | 1.846-01 | -2.956-02 | 1.229-01 | -6.520-03 | 0.000+00 | -1.186-01 |
| 21 | 32.26 | 0.000+00 | 0.000+00 | -1.373-01 | 9.937-02 | -2.856-01 | 4.365-02 | 0.000+00 | -2.806-02 |

Table 1 (continue)

Jf 5 Tf 1 Par -1 No 21 J 2 T 1

| | Energy | 1d5<-1p3 | 2s1<-1p3 | 1d3<-1p3 | 1d5<-1p1 | 2s1<-1p1 | 1d3<-1p1 | 1p3<-1s1 | 1p1<-1s1 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.26 | 0.000+00 | 0.000+00 | -5.547-02 | -3.794-02 | -7.016-02 | -6.373-01 | 0.000+00 | 2.676-02 |
| 2 | 8.35 | 0.000+00 | 0.000+00 | -3.218-01 | 1.417-02 | -2.393-03 | -4.864-01 | 0.000+00 | -1.670-01 |
| 3 | 12.30 | 0.000+00 | 0.000+00 | 2.944-01 | -4.730-01 | 1.823-03 | -2.280-02 | 0.000+00 | -5.892-01 |
| 4 | 13.21 | 0.000+00 | 0.000+00 | -1.500-01 | 3.504-01 | -4.217-02 | 1.627-01 | 0.000+00 | -7.197-01 |
| 5 | 13.57 | 0.000+00 | 0.000+00 | -3.535-01 | -1.746-01 | 1.238-01 | 2.864-01 | 0.000+00 | -2.020-01 |
| 6 | 14.60 | 0.000+00 | 0.000+00 | -2.929-01 | -2.359-01 | 9.275-02 | 9.075-02 | 0.000+00 | 2.541-01 |
| 7 | 15.70 | 0.000+00 | 0.000+00 | -4.449-02 | -2.476-01 | -1.156-01 | -6.276-02 | 0.000+00 | -3.172-01 |
| 8 | 16.47 | 0.000+00 | 0.000+00 | -4.223-01 | 3.686-02 | -1.108-01 | -9.030-02 | 0.000+00 | -7.967-02 |
| 9 | 17.08 | 0.000+00 | 0.000+00 | 1.520-01 | 3.294-01 | -2.207-01 | 4.806-02 | 0.000+00 | -3.545-02 |
| 10 | 18.27 | 0.000+00 | 0.000+00 | -1.607-01 | -2.491-01 | -3.281-01 | 1.922-01 | 0.000+00 | 2.593-01 |
| 11 | 19.80 | 0.000+00 | 0.000+00 | -2.230-01 | 1.552-01 | -2.207-01 | 5.355-02 | 0.000+00 | 6.709-03 |
| 12 | 21.30 | 0.000+00 | 0.000+00 | -1.117-01 | -1.558-01 | -6.667-02 | -6.865-04 | 0.000+00 | -4.051-02 |
| 13 | 22.05 | 0.000+00 | 0.000+00 | -8.840-02 | 4.338-03 | 6.687-01 | -2.728-02 | 0.000+00 | 4.188-02 |
| 14 | 22.59 | 0.000+00 | 0.000+00 | -1.075-01 | 7.063-02 | 1.994-01 | 5.770-02 | 0.000+00 | -6.353-02 |
| 15 | 23.40 | 0.000+00 | 0.000+00 | -1.774-01 | -1.240-02 | -5.486-02 | 1.238-01 | 0.000+00 | 5.839-04 |
| 16 | 25.81 | 0.000+00 | 0.000+00 | 3.306-02 | 1.024-01 | 2.288-02 | 9.379-02 | 0.000+00 | -8.931-03 |
| 17 | 26.69 | 0.000+00 | 0.000+00 | -9.849-03 | 1.511-01 | 1.502-02 | -9.430-02 | 0.000+00 | -4.182-02 |
| 18 | 27.29 | 0.000+00 | 0.000+00 | -3.281-02 | -8.417-02 | -2.263-02 | 4.762-02 | 0.000+00 | -2.123-02 |
| 19 | 27.89 | 0.000+00 | 0.000+00 | -1.288-01 | 1.726-02 | 5.765-02 | 9.622-02 | 0.000+00 | -3.084-02 |
| 20 | 30.64 | 0.000+00 | 0.000+00 | -6.152-02 | -3.405-02 | 4.675-02 | -2.934-02 | 0.000+00 | -1.186-01 |
| 21 | 32.26 | 0.000+00 | 0.000+00 | 9.206-02 | -3.968-02 | 1.239-01 | -4.217-02 | 0.000+00 | -2.806-02 |

Table 1 (continue)

| Jf | Tf | Par | No | J | T |
|---|---|---|---|---|---|
| 5 | 1 | -1 | 21 | 3 | 0 |

| | Energy | 1d5<-1p3 | 2s1<-1p3 | 1d3<-1p3 | 1d5<-1p1 | 2s1<-1p1 | 1d3<-1p1 | 1p3<-1s1 | 1p1<-1s1 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.26 | 0.000+00 | 0.000+00 | 3.263-01 | 0.000+00 | -4.229-01 | 1.171+00 | 0.000+00 | 0.000+00 |
| 2 | 8.35 | 0.000+00 | 0.000+00 | -1.237-01 | 0.000+00 | -3.418-02 | 1.077-01 | 0.000+00 | 0.000+00 |
| 3 | 12.30 | 0.000+00 | 0.000+00 | 9.891-02 | 0.000+00 | -4.573-03 | -9.882-02 | 0.000+00 | 0.000+00 |
| 4 | 13.21 | 0.000+00 | 0.000+00 | 3.869-01 | 0.000+00 | -2.624-01 | -1.254-01 | 0.000+00 | 0.000+00 |
| 5 | 13.57 | 0.000+00 | 0.000+00 | -1.730-01 | 0.000+00 | -3.652-02 | 4.515-02 | 0.000+00 | 0.000+00 |
| 6 | 14.60 | 0.000+00 | 0.000+00 | 6.837-01 | 0.000+00 | -4.909-02 | -2.669-01 | 0.000+00 | 0.000+00 |
| 7 | 15.70 | 0.000+00 | 0.000+00 | -3.282-01 | 0.000+00 | 5.083-02 | 2.676-02 | 0.000+00 | 0.000+00 |
| 8 | 16.47 | 0.000+00 | 0.000+00 | -5.594-01 | 0.000+00 | 4.081-01 | 1.124-01 | 0.000+00 | 0.000+00 |
| 9 | 17.08 | 0.000+00 | 0.000+00 | -3.908-02 | 0.000+00 | -2.421-01 | -2.132-01 | 0.000+00 | 0.000+00 |
| 10 | 18.27 | 0.000+00 | 0.000+00 | -1.116-01 | 0.000+00 | -2.952-01 | -2.419-01 | 0.000+00 | 0.000+00 |
| 11 | 19.80 | 0.000+00 | 0.000+00 | 5.647-02 | 0.000+00 | -2.011-01 | -7.115-02 | 0.000+00 | 0.000+00 |
| 12 | 21.30 | 0.000+00 | 0.000+00 | 1.206-01 | 0.000+00 | 8.758-02 | 3.617-02 | 0.000+00 | 0.000+00 |
| 13 | 22.05 | 0.000+00 | 0.000+00 | -1.995-01 | 0.000+00 | -4.169-01 | -6.888-02 | 0.000+00 | 0.000+00 |
| 14 | 22.59 | 0.000+00 | 0.000+00 | 2.234-01 | 0.000+00 | 3.095-01 | -5.363-02 | 0.000+00 | 0.000+00 |
| 15 | 23.40 | 0.000+00 | 0.000+00 | 5.245-01 | 0.000+00 | 4.106-02 | -3.554-01 | 0.000+00 | 0.000+00 |
| 16 | 25.81 | 0.000+00 | 0.000+00 | -2.483-01 | 0.000+00 | -4.923-01 | -2.247-01 | 0.000+00 | 0.000+00 |
| 17 | 26.69 | 0.000+00 | 0.000+00 | 1.732-01 | 0.000+00 | 5.644-01 | 2.263-01 | 0.000+00 | 0.000+00 |
| 18 | 27.29 | 0.000+00 | 0.000+00 | 6.680-02 | 0.000+00 | -3.082-02 | -9.018-02 | 0.000+00 | 0.000+00 |
| 19 | 27.89 | 0.000+00 | 0.000+00 | -1.775-01 | 0.000+00 | -3.527-01 | -3.622-02 | 0.000+00 | 0.000+00 |
| 20 | 30.64 | 0.000+00 | 0.000+00 | 7.698-02 | 0.000+00 | 8.775-02 | 3.400-02 | 0.000+00 | 0.000+00 |
| 21 | 32.26 | 0.000+00 | 0.000+00 | -3.294-04 | 0.000+00 | 1.488-01 | 7.917-02 | 0.000+00 | 0.000+00 |

Table 1 (continue)

Jf Tf Par No J T
5 1 -1 21 3 1

| | Energy | 1d5<-1p3 | 2s1<-1p3 | 1d3<-1p3 | 1d5<-1p1 | 2s1<-1p1 | 1d3<-1p1 | 1p3<-1s1 | 1p1<-1s1 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 6.26 | 0.000+00 | 0.000+00 | 3.427-02 | 0.000+00 | -5.203-02 | -8.139-02 | 0.000+00 | 0.000+00 |
| 2 | 8.35 | 0.000+00 | 0.000+00 | -3.054-01 | 0.000+00 | -1.280-02 | 5.273-01 | 0.000+00 | 0.000+00 |
| 3 | 12.30 | 0.000+00 | 0.000+00 | 1.170-01 | 0.000+00 | -1.257-01 | 1.026-01 | 0.000+00 | 0.000+00 |
| 4 | 13.21 | 0.000+00 | 0.000+00 | 1.441-01 | 0.000+00 | -1.040-02 | -1.093-01 | 0.000+00 | 0.000+00 |
| 5 | 13.57 | 0.000+00 | 0.000+00 | -3.311-01 | 0.000+00 | -7.634-02 | -3.944-01 | 0.000+00 | 0.000+00 |
| 6 | 14.60 | 0.000+00 | 0.000+00 | 1.862-01 | 0.000+00 | 1.097-02 | 8.671-02 | 0.000+00 | 0.000+00 |
| 7 | 15.70 | 0.000+00 | 0.000+00 | -4.027-02 | 0.000+00 | -7.224-02 | 5.838-02 | 0.000+00 | 0.000+00 |
| 8 | 16.47 | 0.000+00 | 0.000+00 | 3.759-01 | 0.000+00 | 5.123-02 | 2.854-02 | 0.000+00 | 0.000+00 |
| 9 | 17.08 | 0.000+00 | 0.000+00 | -1.029-01 | 0.000+00 | -2.558-01 | 9.985-02 | 0.000+00 | 0.000+00 |
| 10 | 18.27 | 0.000+00 | 0.000+00 | 6.289-03 | 0.000+00 | -3.106-01 | -5.884-02 | 0.000+00 | 0.000+00 |
| 11 | 19.80 | 0.000+00 | 0.000+00 | 1.695-01 | 0.000+00 | -7.574-02 | -1.358-02 | 0.000+00 | 0.000+00 |
| 12 | 21.30 | 0.000+00 | 0.000+00 | 5.210-02 | 0.000+00 | 2.324-02 | -2.627-02 | 0.000+00 | 0.000+00 |
| 13 | 22.05 | 0.000+00 | 0.000+00 | 1.856-01 | 0.000+00 | -2.330-01 | 8.576-02 | 0.000+00 | 0.000+00 |
| 14 | 22.59 | 0.000+00 | 0.000+00 | -2.040-01 | 0.000+00 | 7.632-02 | -3.191-02 | 0.000+00 | 0.000+00 |
| 15 | 23.40 | 0.000+00 | 0.000+00 | -1.023-01 | 0.000+00 | -2.272-02 | 1.118-01 | 0.000+00 | 0.000+00 |
| 16 | 25.81 | 0.000+00 | 0.000+00 | 5.022-02 | 0.000+00 | 3.056-01 | 5.130-02 | 0.000+00 | 0.000+00 |
| 17 | 26.69 | 0.000+00 | 0.000+00 | 6.352-03 | 0.000+00 | -1.085-01 | -5.187-02 | 0.000+00 | 0.000+00 |
| 18 | 27.29 | 0.000+00 | 0.000+00 | -1.773-02 | 0.000+00 | 1.890-01 | 8.109-03 | 0.000+00 | 0.000+00 |
| 19 | 27.89 | 0.000+00 | 0.000+00 | -1.453-01 | 0.000+00 | 8.081-02 | -9.311-02 | 0.000+00 | 0.000+00 |
| 20 | 30.64 | 0.000+00 | 0.000+00 | 3.749-02 | 0.000+00 | 2.269-01 | 1.118-02 | 0.000+00 | 0.000+00 |
| 21 | 32.26 | 0.000+00 | 0.000+00 | 3.545-02 | 0.000+00 | 8.221-03 | -6.659-03 | 0.000+00 | 0.000+00 |

Table 1 (continue)

| Jf | Tf | Par | No | J | T |
|---|---|---|---|---|---|
| 7 | 1 | -1 | 13 | 3 | 0 |

| | Energy | 1d5<-1p3 | 2s1<-1p3 | 1d3<-1p3 | 1d5<-1p1 | 2s1<-1p1 | 1d3<-1p1 | 1p3<-1s1 | 1p1<-1s1 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 7.25 | 0.000+00 | 0.000+00 | -4.932-01 | 0.000+00 | 4.590-01 | -9.320-01 | 0.000+00 | 0.000+00 |
| 2 | 12.16 | 0.000+00 | 0.000+00 | -1.633-01 | 0.000+00 | -1.848-02 | 6.281-02 | 0.000+00 | 0.000+00 |
| 3 | 13.39 | 0.000+00 | 0.000+00 | 8.346-01 | 0.000+00 | -6.819-02 | -3.760-01 | 0.000+00 | 0.000+00 |
| 4 | 14.90 | 0.000+00 | 0.000+00 | -8.057-01 | 0.000+00 | 6.143-01 | 1.914-01 | 0.000+00 | 0.000+00 |
| 5 | 18.08 | 0.000+00 | 0.000+00 | 1.234-01 | 0.000+00 | 1.826-01 | -3.825-03 | 0.000+00 | 0.000+00 |
| 6 | 18.37 | 0.000+00 | 0.000+00 | -6.878-02 | 0.000+00 | 4.073-01 | 1.450-01 | 0.000+00 | 0.000+00 |
| 7 | 20.03 | 0.000+00 | 0.000+00 | -9.744-02 | 0.000+00 | 3.044-01 | 1.271-01 | 0.000+00 | 0.000+00 |
| 8 | 20.62 | 0.000+00 | 0.000+00 | 5.190-01 | 0.000+00 | 1.031+00 | 1.658-01 | 0.000+00 | 0.000+00 |
| 9 | 22.60 | 0.000+00 | 0.000+00 | 1.883-01 | 0.000+00 | 4.399-01 | 7.156-02 | 0.000+00 | 0.000+00 |
| 10 | 23.01 | 0.000+00 | 0.000+00 | 3.869-01 | 0.000+00 | 1.956-01 | -1.048-01 | 0.000+00 | 0.000+00 |
| 11 | 24.49 | 0.000+00 | 0.000+00 | 4.830-02 | 0.000+00 | 1.447-01 | 6.955-02 | 0.000+00 | 0.000+00 |
| 12 | 25.93 | 0.000+00 | 0.000+00 | -3.518-01 | 0.000+00 | -1.297-01 | 7.733-02 | 0.000+00 | 0.000+00 |
| 13 | 30.04 | 0.000+00 | 0.000+00 | 2.450-01 | 0.000+00 | 2.621-01 | 2.569-02 | 0.000+00 | 0.000+00 |

| 7 | 1 | -1 | 13 | 3 | 1 |
|---|---|---|---|---|---|
| 1 | 7.25 | 0.000+00 | 0.000+00 | 9.029-02 | 0.000+00 | 1.801-02 | -9.320-01 | 0.000+00 | 0.000+00 |
| 2 | 12.16 | 0.000+00 | 0.000+00 | 6.659-01 | 0.000+00 | 8.062-02 | 6.281-02 | 0.000+00 | 0.000+00 |
| 3 | 13.39 | 0.000+00 | 0.000+00 | -1.063-01 | 0.000+00 | -9.345-02 | -3.760-01 | 0.000+00 | 0.000+00 |
| 4 | 14.90 | 0.000+00 | 0.000+00 | -3.667-01 | 0.000+00 | -6.396-02 | 1.914-01 | 0.000+00 | 0.000+00 |
| 5 | 18.08 | 0.000+00 | 0.000+00 | 3.779-02 | 0.000+00 | -2.919-01 | -3.825-03 | 0.000+00 | 0.000+00 |
| 6 | 18.37 | 0.000+00 | 0.000+00 | 2.191-01 | 0.000+00 | 1.168-01 | 1.450-01 | 0.000+00 | 0.000+00 |
| 7 | 20.03 | 0.000+00 | 0.000+00 | 2.261-01 | 0.000+00 | -1.107-01 | 1.271-01 | 0.000+00 | 0.000+00 |
| 8 | 20.62 | 0.000+00 | 0.000+00 | 2.993-02 | 0.000+00 | 3.575-01 | 1.658-01 | 0.000+00 | 0.000+00 |
| 9 | 22.60 | 0.000+00 | 0.000+00 | 1.277-01 | 0.000+00 | -6.465-01 | 7.156-02 | 0.000+00 | 0.000+00 |
| 10 | 23.01 | 0.000+00 | 0.000+00 | -1.038-01 | 0.000+00 | 1.919-01 | -1.048-01 | 0.000+00 | 0.000+00 |
| 11 | 24.49 | 0.000+00 | 0.000+00 | -4.540-02 | 0.000+00 | -1.912-01 | 6.955-02 | 0.000+00 | 0.000+00 |
| 12 | 25.93 | 0.000+00 | 0.000+00 | -6.773-02 | 0.000+00 | 8.916-02 | 7.733-02 | 0.000+00 | 0.000+00 |
| 13 | 30.04 | 0.000+00 | 0.000+00 | -1.717-01 | 0.000+00 | -6.381-02 | 2.569-02 | 0.000+00 | 0.000+00 |

Table 1 (continue)

| Jf | Tf | Par | No | J | T |
|---|---|---|---|---|---|
| 7 | 1 | -1 | 13 | 4 | 0 |

| | Energy | 1d5<-1p3 | 2s1<-1p3 | 1d3<-1p3 | 1d5<-1p1 | 2s1<-1p1 | 1d3<-1p1 | 1p3<-1s1 | 1p1<-1s1 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 7.25 | 0.000+00 | 0.000+00 | -9.842-02 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 2 | 12.16 | 0.000+00 | 0.000+00 | 2.758-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 3 | 13.39 | 0.000+00 | 0.000+00 | 2.720-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 4 | 14.90 | 0.000+00 | 0.000+00 | 3.189-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 5 | 18.08 | 0.000+00 | 0.000+00 | -8.609-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 6 | 18.37 | 0.000+00 | 0.000+00 | 7.759-02 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 7 | 20.03 | 0.000+00 | 0.000+00 | -1.854-02 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 8 | 20.62 | 0.000+00 | 0.000+00 | -2.727-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 9 | 22.60 | 0.000+00 | 0.000+00 | 4.625-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 10 | 23.01 | 0.000+00 | 0.000+00 | 6.721-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 11 | 24.49 | 0.000+00 | 0.000+00 | -7.165-02 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 12 | 25.93 | 0.000+00 | 0.000+00 | 1.266-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 13 | 30.04 | 0.000+00 | 0.000+00 | -8.729-02 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |

| Jf | Tf | Par | No | J | T |
|---|---|---|---|---|---|
| 7 | 1 | -1 | 13 | 4 | 1 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 7.25 | 0.000+00 | 0.000+00 | -1.069-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 2 | 12.16 | 0.000+00 | 0.000+00 | 3.631-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 3 | 13.39 | 0.000+00 | 0.000+00 | 3.278-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 4 | 14.90 | 0.000+00 | 0.000+00 | 3.882-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 5 | 18.08 | 0.000+00 | 0.000+00 | 2.318-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 6 | 18.37 | 0.000+00 | 0.000+00 | -1.623-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 7 | 20.03 | 0.000+00 | 0.000+00 | -1.923-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 8 | 20.62 | 0.000+00 | 0.000+00 | 7.334-03 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 9 | 22.60 | 0.000+00 | 0.000+00 | -1.301-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 10 | 23.01 | 0.000+00 | 0.000+00 | -7.268-02 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 11 | 24.49 | 0.000+00 | 0.000+00 | -1.659-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 12 | 25.93 | 0.000+00 | 0.000+00 | -1.513-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 13 | 30.04 | 0.000+00 | 0.000+00 | -3.733-02 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |

Table 1 (continue)

| Jf | Tf | Par | No | J | T |
|---|---|---|---|---|---|
| 9 | 1 | -1 | 5 | 4 | 0 |

| | Energy | 1d5<-1p3 | 2s1<-1p3 | 1d3<-1p3 | 1d5<-1p1 | 2s1<-1p1 | 1d3<-1p1 | 1p3<-1s1 | 1p1<-1s1 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 12.71 | 0.000+00 | 0.000+00 | 5.300-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 2 | 16.65 | 0.000+00 | 0.000+00 | 1.031+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 3 | 19.65 | 0.000+00 | 0.000+00 | 7.964-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 4 | 24.28 | 0.000+00 | 0.000+00 | 4.783-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 5 | 26.44 | 0.000+00 | 0.000+00 | 1.283-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |

| 9 | 1 | -1 | 5 | 4 | 1 |
|---|---|---|---|---|---|
| 1 | 12.71 | 0.000+00 | 0.000+00 | -6.945-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 2 | 16.65 | 0.000+00 | 0.000+00 | 4.271-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 3 | 19.65 | 0.000+00 | 0.000+00 | 7.440-02 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 4 | 24.28 | 0.000+00 | 0.000+00 | -2.596-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 5 | 26.44 | 0.000+00 | 0.000+00 | -5.594-02 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |

| 1 | 3 | -1 | 8 | 1 | 1 |
|---|---|---|---|---|---|
| 1 | 12.34 | 0.000+00 | 0.000+00 | 1.306-01 | 4.276-02 | 1.584-02 | 0.000+00 | -1.059+00 | 0.000+00 |
| 2 | 22.84 | 0.000+00 | 0.000+00 | 2.579-01 | -8.858-01 | -7.870-02 | 0.000+00 | 7.019-02 | 0.000+00 |
| 3 | 24.42 | 0.000+00 | 0.000+00 | -8.632-01 | -2.250-01 | 1.542-01 | 0.000+00 | -7.249-02 | 0.000+00 |
| 4 | 26.28 | 0.000+00 | 0.000+00 | -5.919-02 | -1.712-01 | 1.226-01 | 0.000+00 | -4.105-01 | 0.000+00 |
| 5 | 27.06 | 0.000+00 | 0.000+00 | -1.376-01 | -5.197-02 | -9.400-02 | 0.000+00 | -3.581-02 | 0.000+00 |
| 6 | 28.20 | 0.000+00 | 0.000+00 | 1.746-01 | 2.378-02 | 8.480-01 | 0.000+00 | 1.381-01 | 0.000+00 |
| 7 | 29.88 | 0.000+00 | 0.000+00 | -3.779-02 | -1.362-01 | 3.162-01 | 0.000+00 | -1.156-01 | 0.000+00 |
| 8 | 34.42 | 0.000+00 | 0.000+00 | 7.676-02 | 2.649-02 | 1.254-01 | 0.000+00 | -1.257-03 | 0.000+00 |

Table 1 (continue)

| Jf | Tf | Par | No | J | T |
|---|---|---|---|---|---|
| 3 | 3 | -1 | 11 | 1 | 1 |

| | Energy | 1d5<-1p3 | 2s1<-1p3 | 1d3<-1p3 | 1d5<-1p1 | 2s1<-1p1 | 1d3<-1p1 | 1p3<-1s1 | 1p1<-1s1 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 17.06 | 0.000+00 | 0.000+00 | 2.802-01 | 1.249-01 | -2.698-01 | 0.000+00 | 0.000+00 | -9.966-01 |
| 2 | 19.92 | 0.000+00 | 0.000+00 | -2.370-01 | 1.071+00 | 1.249-01 | 0.000+00 | 0.000+00 | 6.297-03 |
| 3 | 21.35 | 0.000+00 | 0.000+00 | 1.848-03 | 6.247-01 | 3.301-02 | 0.000+00 | 0.000+00 | 5.809-02 |
| 4 | 22.22 | 0.000+00 | 0.000+00 | -2.625-01 | -3.708-02 | 1.218-02 | 0.000+00 | 0.000+00 | -2.599-01 |
| 5 | 25.00 | 0.000+00 | 0.000+00 | 1.102+00 | 2.288-01 | -2.874-01 | 0.000+00 | 0.000+00 | 2.514-01 |
| 6 | 26.72 | 0.000+00 | 0.000+00 | -2.673-01 | 1.495-01 | -1.567-01 | 0.000+00 | 0.000+00 | 1.504-01 |
| 7 | 27.15 | 0.000+00 | 0.000+00 | -3.513-01 | 2.455-02 | -1.212+00 | 0.000+00 | 0.000+00 | 1.587-01 |
| 8 | 29.13 | 0.000+00 | 0.000+00 | 2.289-01 | 3.078-01 | -9.360-02 | 0.000+00 | 0.000+00 | -7.953-02 |
| 9 | 30.75 | 0.000+00 | 0.000+00 | -2.727-01 | 2.247-01 | 5.930-02 | 0.000+00 | 0.000+00 | 8.639-02 |
| 10 | 32.40 | 0.000+00 | 0.000+00 | -1.410-01 | -1.147-02 | -1.996-01 | 0.000+00 | 0.000+00 | -3.090-01 |
| 11 | 34.12 | 0.000+00 | 0.000+00 | 1.335-01 | -4.787-02 | -2.466-01 | 0.000+00 | 0.000+00 | 2.209-01 |
| 3 | 3 | -1 | 11 | 2 | 1 | | | | |
| 1 | 17.06 | 0.000+00 | 0.000+00 | -1.139-01 | -9.501-02 | 6.864-02 | 0.000+00 | 0.000+00 | -9.966-01 |
| 2 | 19.92 | 0.000+00 | 0.000+00 | 2.873-01 | -4.129-01 | -5.131-02 | 0.000+00 | 0.000+00 | 6.297-03 |
| 3 | 21.35 | 0.000+00 | 0.000+00 | -5.674-01 | 6.884-01 | -2.040-02 | 0.000+00 | 0.000+00 | 5.809-02 |
| 4 | 22.22 | 0.000+00 | 0.000+00 | 7.401-01 | 6.228-01 | -8.638-02 | 0.000+00 | 0.000+00 | -2.599-01 |
| 5 | 25.00 | 0.000+00 | 0.000+00 | 2.829-01 | 1.137-01 | 1.572-02 | 0.000+00 | 0.000+00 | 2.514-01 |
| 6 | 26.72 | 0.000+00 | 0.000+00 | 9.691-02 | 7.428-02 | 9.174-01 | 0.000+00 | 0.000+00 | 1.504-01 |
| 7 | 27.15 | 0.000+00 | 0.000+00 | -8.755-03 | -3.376-02 | -1.924-01 | 0.000+00 | 0.000+00 | 1.587-01 |
| 8 | 29.13 | 0.000+00 | 0.000+00 | 6.987-03 | -1.244-02 | 3.923-02 | 0.000+00 | 0.000+00 | -7.953-02 |
| 9 | 30.75 | 0.000+00 | 0.000+00 | 1.977-02 | 6.667-02 | -3.969-01 | 0.000+00 | 0.000+00 | 8.639-02 |
| 10 | 32.40 | 0.000+00 | 0.000+00 | -1.026-01 | 3.437-02 | 1.111-01 | 0.000+00 | 0.000+00 | -3.090-01 |
| 11 | 34.12 | 0.000+00 | 0.000+00 | -3.242-02 | -3.248-03 | 3.553-02 | 0.000+00 | 0.000+00 | 2.209-01 |

Table 1 (continue)

| Jf | Tf | Par | No | J | T |
|---|---|---|---|---|---|
| 5 | 3 | -1 | 10 | 2 | 1 |

| | Energy | 1d5<-1p3 | 2s1<-1p3 | 1d3<-1p3 | 1d5<-1p1 | 2s1<-1p1 | 1d3<-1p1 | 1p3<-1s1 | 1p1<-1s1 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 12.87 | 0.000+00 | 0.000+00 | -2.249-01 | -7.002-02 | -8.781-02 | -1.015+00 | 0.000+00 | 0.000+00 |
| 2 | 18.99 | 0.000+00 | 0.000+00 | 5.728-01 | -1.028+00 | -4.133-02 | -8.881-02 | 0.000+00 | 0.000+00 |
| 3 | 20.89 | 0.000+00 | 0.000+00 | -7.445-01 | -6.437-01 | 2.887-01 | 2.889-01 | 0.000+00 | 0.000+00 |
| 4 | 22.15 | 0.000+00 | 0.000+00 | -6.279-01 | -1.044-01 | 8.761-02 | 1.724-02 | 0.000+00 | 0.000+00 |
| 5 | 24.38 | 0.000+00 | 0.000+00 | 2.432-01 | 1.397-01 | 1.110+00 | -2.137-01 | 0.000+00 | 0.000+00 |
| 6 | 26.13 | 0.000+00 | 0.000+00 | -2.680-01 | -1.847-01 | -2.254-01 | -3.446-01 | 0.000+00 | 0.000+00 |
| 7 | 27.58 | 0.000+00 | 0.000+00 | -1.442-01 | -1.146-01 | 3.631-01 | -1.740-02 | 0.000+00 | 0.000+00 |
| 8 | 27.88 | 0.000+00 | 0.000+00 | -2.536-01 | 1.790-01 | -4.414-03 | -1.562-01 | 0.000+00 | 0.000+00 |
| 9 | 31.22 | 0.000+00 | 0.000+00 | 2.301-01 | -1.149-01 | 5.181-02 | -1.516-01 | 0.000+00 | 0.000+00 |
| 10 | 35.17 | 0.000+00 | 0.000+00 | -6.045-02 | -7.147-03 | 2.854-01 | -1.597-02 | 0.000+00 | 0.000+00 |
| 5 | 3 | -1 | 10 | 3 | 1 | | | | |
| 1 | 12.87 | 0.000+00 | 0.000+00 | 1.724-01 | 0.000+00 | 1.633-02 | -1.015+00 | 0.000+00 | 0.000+00 |
| 2 | 18.99 | 0.000+00 | 0.000+00 | -2.162-01 | 0.000+00 | 1.273-02 | -8.881-02 | 0.000+00 | 0.000+00 |
| 3 | 20.89 | 0.000+00 | 0.000+00 | 5.085-01 | 0.000+00 | 7.565-03 | 2.889-01 | 0.000+00 | 0.000+00 |
| 4 | 22.15 | 0.000+00 | 0.000+00 | -8.818-01 | 0.000+00 | -1.357-01 | 1.724-02 | 0.000+00 | 0.000+00 |
| 5 | 24.38 | 0.000+00 | 0.000+00 | -3.246-02 | 0.000+00 | -2.073-01 | -2.137-01 | 0.000+00 | 0.000+00 |
| 6 | 26.13 | 0.000+00 | 0.000+00 | -1.586-02 | 0.000+00 | -3.317-01 | -3.446-01 | 0.000+00 | 0.000+00 |
| 7 | 27.58 | 0.000+00 | 0.000+00 | -1.286-01 | 0.000+00 | 6.823-01 | -1.740-02 | 0.000+00 | 0.000+00 |
| 8 | 27.88 | 0.000+00 | 0.000+00 | 1.448-02 | 0.000+00 | 5.051-01 | -1.562-01 | 0.000+00 | 0.000+00 |
| 9 | 31.22 | 0.000+00 | 0.000+00 | -8.462-02 | 0.000+00 | 3.657-01 | -1.516-01 | 0.000+00 | 0.000+00 |
| 10 | 35.17 | 0.000+00 | 0.000+00 | 7.095-02 | 0.000+00 | -3.413-01 | -1.597-02 | 0.000+00 | 0.000+00 |

Table 1 (continue)

| Jf | Tf | Par | No | J | T |
|---|---|---|---|---|---|
| 7 | 3 | -1 | 5 | 3 | 1 |

| | Energy | 1d5<-1p3 | 2s1<-1p3 | 1d3<-1p3 | 1d5<-1p1 | 2s1<-1p1 | 1d3<-1p1 | 1p3<-1s1 | 1p1<-1s1 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 19.08 | 0.000+00 | 0.000+00 | 1.057+00 | 0.000+00 | 1.445-01 | 0.000+00 | 0.000+00 | 0.000+00 |
| 2 | 22.15 | 0.000+00 | 0.000+00 | 4.984-01 | 0.000+00 | 1.452-01 | 0.000+00 | 0.000+00 | 0.000+00 |
| 3 | 25.00 | 0.000+00 | 0.000+00 | 1.707-01 | 0.000+00 | -1.188+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 4 | 28.41 | 0.000+00 | 0.000+00 | -3.566-01 | 0.000+00 | 3.853-02 | 0.000+00 | 0.000+00 | 0.000+00 |
| 5 | 33.55 | 0.000+00 | 0.000+00 | -3.273-02 | 0.000+00 | 2.625-01 | 0.000+00 | 0.000+00 | 0.000+00 |

| Jf | Tf | Par | No | J | T |
|---|---|---|---|---|---|
| 7 | 3 | -1 | 5 | 4 | 1 |

| | Energy | 1d5<-1p3 | 2s1<-1p3 | 1d3<-1p3 | 1d5<-1p1 | 2s1<-1p1 | 1d3<-1p1 | 1p3<-1s1 | 1p1<-1s1 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 19.08 | 0.000+00 | 0.000+00 | -3.965-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 2 | 22.15 | 0.000+00 | 0.000+00 | 9.822-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 3 | 25.00 | 0.000+00 | 0.000+00 | 6.474-02 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 4 | 28.41 | 0.000+00 | 0.000+00 | 2.340-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 5 | 33.55 | 0.000+00 | 0.000+00 | -6.625-02 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |

| Jf | Tf | Par | No | J | T |
|---|---|---|---|---|---|
| 9 | 3 | -1 | 2 | 4 | 1 |

| | Energy | 1d5<-1p3 | 2s1<-1p3 | 1d3<-1p3 | 1d5<-1p1 | 2s1<-1p1 | 1d3<-1p1 | 1p3<-1s1 | 1p1<-1s1 |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 20.07 | 0.000+00 | 0.000+00 | -1.202+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |
| 2 | 26.73 | 0.000+00 | 0.000+00 | -1.890-01 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 | 0.000+00 |

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