OPTMAN input file description

- Record 1 - FORMAT(20A4)
  Any text information that identifies current calculation. It will be printed in the head of output.
- Record 2 - FORMAT(20I2)
  `MEJOB`, `MEPOT`, `MEHAM`, `MEPRI`, `MESOL`, `MESHA`, `MESHO`, `MEHAO`, `MEAPP`, `MEVOL`, `MEREL`, `MECUL`, `MERZZ`, `MERRR`, `MEDIS`, `MERIP`, `MEDEF`, `MEAXI`, `MERAD`
  Switches options describing the model.
  - `MEJOB` = 1 - optical calculations, = 2 adjustment of optical potential parameters;
  - `MEPOT` = 1 -rotational model potential, =2 - potential expanded by derivatives;
  - `MEHAM` = 1 - nuclear Hamiltonian of rotational model, = 2 - not in use yet, = 3 - Davydov-Chaban model, = 4 - Davydov-Philipov model, = 5 - nuclear Hamiltonian with account of γ softness, =6,7 - not in use yet;
  - `MEPRI` = 0 - short output, additional output as `MEPRI` is increasing ;
  - `MESOL` = 1 - code will choose which method of coupled channels system solution for a certain J^π should be used to reduce time of calculations, = 2 - exact solution, =3 - solution using iterations, with spherical solutions as zero approximation, >3 - solution using iterations, with exact couple channels solution with number of coupled states equal `MESOL` as zero approximation, `MESOL` must be less than or equal to 20;
  - `MESHA` = 1 - rigid hexadecapole deformations are not taken into account, = 2 - with account of axial rigid hexadecapole deformations, = 3 - rigid hexadecapole deformations depending on γ, = 4 - rigid hexadecapole deformations in the most general case;
  - `MESHO` = 0 - nuclear shape without octupole deformations, = 1 -nuclear shape with axial octupole deformations, = 2 - nuclear shape with non-axial octupole deformations;
  - `MEHAO` = 0 - nucleus is rigid to octupole deformations, = 1 - nucleus is soft to non symmetric octupole, = 2 - nucleus is soft to symmetric octupole deformations scaled by β_2, = 3 - nucleus is soft to symmetric octupole deformations not scaled by β_2;
  - `MEAPP` = 0 - solution with the potential dependency on level energy losses in the channel, =1 - quick solution without potential dependency on level energy losses, can be used when energies of levels are much less than particle incident energy;
  - `MEVOL` = 0 - solution without account of volume conservation, =1 - account of volume conservation in uniform nuclear density approximation(dynamic monopole volume conservation term is added to coupling), =2 - common case, presenting nuclear density distribution by real potential form factor;
  - `MEREL` = 0 - calculations using non-relativistic Schrödinger formalism, =1 - account of relativistic kinematics and potential dependence, =2 - account of relativistic kinematic only, =3 - account of relativistic kinematics and real potential dependence;
  - `MECUL` = 0 - solution with Coulomb correction potential proportional to derivative of real potential dependence, = 1 - Coulomb correction is energy independent, = 2 - Lane consistent Coulomb correction with ”effective” nu-

clear potential energy for protons equal to incident energy minus Coulomb displacement energy (CDE), applied both to real and imaginary parts of the potential, = 3 - Coulomb correction with "effective" nuclear potential energy for protons equal to incident energy minus CDE, applied to the real part of the potential only;
- MERZZ = 0 - charge radius is considered constant, = 1 - charge radius is considered energy dependent;
- MERRR = 0 - real potential radius is considered constant, = 1 - charge radius is considered energy dependent;
- MEDIS = 0 - without account of dispersion relations between real and imaginary potentials, = 1 - account of dispersion relations between real and imaginary parts of the potential, =3 - account of dispersion relations between real and imaginary parts of the potential excluding spin-orbit potential;
- MERIP = 0 - reads potential one time, then calculates necessary one in each energy point inside OPTMAN, =1 - takes potential from RIPL interface, this is recommended only in case levels energy is much less than incident energy, even in this case gives approximate results;
- MEDEF = 0 - deformations of non-GS-band levels are supposed to be adjustable parameters given in input file, = 1 - deformations of non-GS-band levels are calculated using soft-rotator model, = 2 - coupling from non-axial rigid rotor model (only GS- and non-axial bands), but $gamma_0$ is read from soft-rotator Hamiltonian parameters block;
- MEAXI = 0 - non-axial weight coefficients are $A_K^{I\tau} = \delta_{\tau,1}$, i.e. nucleus assumed to be axial, = 1 - non-axial weight coefficients are calculated using corresponding model;
- MERAD = 0 - all potentials radii are independent on static deformations, but additional (static) term is added to monopole coupling coefficient appearing due to dynamic volume conservation $[\beta_{00}]_{eff} += -\frac{\beta_{20}^2}{\sqrt{4\pi}}$, = 1 - potentials radii are corrected using static volume conservation $R_{0i}^{corr} = R_{0i}\left(1 - \frac{\sum_{\lambda=2,4,6}\beta_\lambda^2}{4\pi}\right)$ for each considered nucleus, = 2 - no static radius correction of any kind.

– Record 3 - FORMAT(6E12.7), cards - 3a, 3b, 3c, not read in this place if MEJOB=2 Parameters of non-axial nuclear Hamiltonian. These cards are read if MEHAM $>$ 1 or MEDEF$>$0 or MEAXI = 1 or MEVOL$>$0.

HW, AMBO, AMGO, GAMO, BETO, BET4 - card 3a
- HW - energy scale factor $\hbar\omega_0$;
- AMBO - nuclear softness μ_{β_2};
- AMGO - nuclear softness μ_{γ_0},
- GAMO - equilibrium non-axiality $0 < \gamma_0 < \pi/3$ in radians;
- BETO - equilibrium deformation β_{20}, for non-axial Hamiltonian;
- BET4 - rigid deformation β_4, for non-axial Hamiltonian.

BB42, GAMG, DELG, BET3, ETO, AMUO - card 3b
- BB42 - $a_{42} = B_4/B_2(\beta_4/\beta_{20})^2$, where B_λ - are mass parameters;
- GAMG - parameter of β_4 non-axiality, γ_4;
- DELG - parameter of β_4 non-axiality, δ_4;
- BET3 - if MEHAO = 2 - BET3=ε_0 and $\beta_{30} = \beta_{20}\varepsilon_0 =$ BET3 $*$ BETO, if MEHAO = 3 - BET3= equilibrium deformation $\beta_{30} = \varepsilon_0 =$ BET3;
- ETO - non-axiality of octupole β_3 deformation η;

- AMUO - nuclear softness μ_ε.

HWO, BB32, GAMDE, DPAR, GSHAPE - card 3c

- HWO - energy scale for octupole oscillations $\hbar\omega_\varepsilon$, used if MEHAO = 1;
- BB32 - $a_{32} = B_3/B_2(\beta_{30}/\beta_{20})^2$;
- GAMDE - yet not in use;
- DPAR - splitting of energy for the states with different parity in symmetric potential well for octupole oscillations equal δ_n;
- GSHAPE- parameter allowing negative β_2 deformations so that $\cos(\gamma_0 + \text{GHAPE})$ is negative.

- Record 4 - FORMAT(5I.3) this card is read, if only MEJOB=2, for potential parameters adjustment option
  Switches for details of adjustment
  MENUC, MEBET, MEIIS, MERES, MELEV
  - MENUC - number of isotopes experimental data of which is used for potential parameters adjustment (MENUC$\leq$10);
  - MEBET - number of isotope deformations of which should be adjusted, if MEBET=0 then deformations $(\beta_{20}, \beta_4, \beta_6)$ of all isotopes are adjusted;
  - MEIIS - by the moment not in use;
  - MERES - by the moment not in use;
  - MELEV - number of level, other than Ground State (GS) band level for an isotope, deformation of which, that couples it with GS level, should be adjusted; if MEBET>0 and MELEV=0 then band-wise deformations are adjusted for selected isotope, i.e. deformations are the same for all band levels, deformations for all bands are adjusted.
- Record 5 - FORMAT(9I3)
  Switches for details of calculations
  NUR, NST, NPD, LAS, MTET, LLMA, NCMA, NSMA, KODMA
  - NUR - number of coupled levels in optical model calculations (NUR $\leq$ 40). Ignored in case of potential parameters adjustment option (MEJOB = 2), put any value;
  - NST - number of energy points for which optical model calculations will be carried out if MEJOB=1; ignored if MEJOB = 2- potential parameters adjustment option,put any value (NST $\leq$ 50);
  - NPD - the highest multipole Y_{l0} in deformed radii expansion, l_{max} =NPD for rotational model (MEPOT = MEHAM = 1), NPD $\leq$ 8. For non-axial nuclear Hamiltonian models (MEPOT =2, MEHAM > 2), not in use;
  - LAS - the highest multipole Y_{l0} in deformed potential expansion, l_{max}=LAS for rotational model (MEPOT = MEHAM = 1), LAS $\leq$ 8. For non-axial nuclear Hamiltonian models (MEPOT =2, MEHAM > 2), number of potential derivatives for deformed potential expansion, must be no more than 4;
  - MTET - number of angels (in c.m.) for which angular distributions of scattered neutrons will be calculated (used only for MEJOB = 1, for MEJOB = 2 it is not used, put any value), if MTET = 0 angular distributions are not calculated, MTET must be no more than 150;
  - LLMA = maximum angular momentum of scattered neutrons that is taken into account; higher are rejected. LLMA < 90;
  - NCMA - maximum number of coupled equation for certain J^π; NCMA $\leq$ 200;

  - NSMA - maximum number of J^{π} states for which coupled channels systems are solved; NSMA $\leq$ 180;
  - KODMA - = 0 - coupled equations are ordered one by one, first for the first level, then for the second, etc., = 1 - coupled equations are ordered one by one by growing angular momentum of scattered neutrons, the total number of coupled equations $\leq$ NCMA.
- Records 6 - FORMAT(20I.3) this cards are read, if only MEJOB=2, for potential parameters adjustment option, MENUC such records are read (I=1,MENUC).
  Switches for details of adjustment for a certain isotope
  NSTIS(I), NURIS(I), MESOIS(I),NRES(I),MEDEIS(I),MEAXIS(I)
  - NSTIS(I) - number of energy points for ith isotope experimental data of which is used for potential parameters adjustment (MENUC$\leq$10);
  - NURIS(I) - number of levels coupled for I-th of isotope;
  - MESOIS(I) - method of coupled equation system solution for ith isotope (MESOL);
  - NRES(I) - by the moment not in use, should be set equal zero;
  - MEDEIS(I) - MEDEF flag for I-th isotope (overrides global MEDEF);
  - MEAXIS(I) - MEAXI flag for I-th isotope (overrides global MEAXI).
- Record 7 - FORMAT(6E12.7) this card is read, if only MEJOB=2, for potential parameters adjustment option.
  WEI(I),I=1, MENUC
  - WEI(I) - relative weight of ith isotope in natural mixture.

> Below described block of records will be read once for **MEJOB** = 1 and **MENUC** times for **MEJOB** =2.

- Record 3' - FORMAT(6E12.7), same as above Record 3, cards - 3'a, 3'b, 3'c, not read in this place if MEJOB=1
  Parameters of non-axial nuclear Hamiltonian. These cards are read if MEHAM > 1.
- Record 8 - FORMAT(6E12.7)
  MEJOB = 1 - energies (EE(I)) in which optical model cross sections are calculated,
  MEJOB = 2 - energies for experimental points for I-th isotope which will be used for potential adjustment; NST $\leq$ 50
  (EE(I), I=1,NST) - cards 8a, 8b, ...

- Record 9 - FORMAT(36I2)
  Flags determining charge (in units of electron charge) of the incident particles Z' for which calculations for energy EE(I) will be carried out.
  (MCHAE(I), I=1,NST) - card 9a and for NST > 36 - card 9b.
- Record 10 - FORMAT(6E12.7)
  Angles at which angular distributions will be calculated. If MTET = 0 or MEJOB = 2 these cards are not read, MTET must be no more than 150;
  (TET(I), I=1,MTET) - Cards 10a, 10b, ...
- Record 11 - FORMAT(E12.7,5I2,2E12.7,4I2) for MEPOT = 1, FORMAT(E12.7,7I2) for MEPOT > 1
  Characteristics of nuclear levels for I-th isotope
  (EL(I),JO(I),NPO(I),KO(I),NCA(I),NUMB(I),BETB(I),AIGS(I),NTU(I)NNB(I), NNG(I), NNO(I),I=1,NUR) - Cards 11a, 11b, .. for MEPOT =1

(EL(I), JO(I), NPO(I), NTU(I), NNB(I), NNG(I), NNO(I), NCA , I=1,NUR) - Cards 11a, 11b, .. for MEPOT > 1

- EL(I) -energy of the ith level of isotope;
- JO(I) - spin of the level multiplied by two;
- NPO(I) - parity of the level = +1 - for positive, = -1 - for negative;
- KO(I) - K of the levels band multiplied by two;
- NTU(I) - the number of rotational energy solution τ;
- NNB(I) - the number of β_2 oscillation function solution n_{β_2};
- NNG(I) - the number or γ oscillation function solution n_γ;
- NNO(I) - the number of β_3 oscillation function solution n_{β_3};
- NCA(I)- flag =0 for excitations leading to the same isotope, =1 for excitations leading to isobar analog state (IAS) excitation;
- NUMB(I)- flag of the level band, for the GS and IAS band levels should be = 0;
- BETB(I)- deformations of other than GS and IAS levels determining coupling with GS level.
- AIGS(I) - single-particle overlapping factor

- Record 12 - FORMAT(I3) Necessary only for MEJOB=1, nor necessary for MEJOB=2.
  - any blank card.
- Record 13 - FORMAT(6E12.7)
  Individual characteristics of interacting incident particle and isotope
  ANEU, ASP, AT, ZNUC, EFERMN, EFERMP
  - ANEU - incident particle mass;
  - ASP - incident particle spin;
  - AT - interacting nuclear mass;
  - ZNUC - target nuclear charge Z;
  - EFERMN - Fermi energy for neutrons;
  - EFERMP - Fermi energy for protons.

  Attention!!!! End of above described block, for isotopes!!!!!!

- Record 14 - FORMAT(6E12.7)
  A-mass and Z- charge independent optical potential parameters.
  VR0, VR1, VR2, VR3, VRLA, ALAVR - card 14a
  - VR0 - real optical potential V_R constant term V_R^0;
  - VR1 - real optical potential V_R linear term V_R^1;
  - VR2 - real optical potential V_R square term V_R^2;
  - VR3 - real optical potential V_R cubic term V_R^3;
  - VRLA - real optical potential V_R exponential term V_R^{DISP};
  - ALAVR - real optical potential V_R exponential constant λ_R.

  WD0, WD1, WDA1, WDBW, WDWID, ALAWD - card 14b
  - WD0 - imaginary surface potential W_D constant term W_D^0;
  - WD1 - imaginary surface potential W_D linear term W_D^1;
  - WDA1 - imaginary surface potential W_D linear term W_D^1 for the projectile energies above E_{change} ;
  - WDBW - imaginary surface potential W_D term W_D^{DISP};

- WDWID - imaginary surface potential W_D dispersion width WID_D;
- ALAWD - imaginary surface potential W_D exponential constant λ_D.

WCO, WC1, WCA1, WCBW, WCWID, BNDC - card 14c

- WCO - imaginary volume potential W_V constant term W_V^0;
- WC1 - imaginary volume potential W_V linear term W_V^1;
- WCA1 - imaginary volume potential W_V linear term W_V^1 for the projectile energies above E_{change} ;
- WCBW - imaginary volume potential W_V term W_V^{DISP};
- WCWID - imaginary volume potential W_V dispersion width WID_V;
- BNDC - boundary energy where linear potential slopes change E_{change}.

VS, ALASO, WSO, WS1, WSBW, WSWID - card 14d

- VS - real spin orbit potential V_{SO}^0;
- ALASO - real spin orbit potential V_{SO} exponential constant λ_{so};
- WSO - imaginary spin orbit potential W_{SO} constant term W_{SO}^0;
- WS1- imaginary spin orbit potential W_{SO} linear term W_{SO}^1;
- WSBW - imaginary spin orbit potential W_{SO} term W_{SO}^{DISP};
- WSWID - imaginary spin orbit potential W_{SO} dispersion width WID_{SO}.

RR, RRBWC, RRWID, PDIS, AR0, AR1 - card 14e

- RR - real potential radius R_R;
- RRBWC - real potential radius R_R dispersion constant C_R;
- RRWID - real potential radius R_R dispersion width WID_R;
- PDIS - dispersion power constant S;
- AR0- real potential diffuseness a_R constant term a_R^0;
- AR1 - real potential diffuseness a_R linear term a_R^1.

RD, AD0, AD1, RC, AC0, AC1 - card 14f

- RD - imaginary surface potential radius R_D;
- AD0 -imaginary surface potential diffuseness a_D constant term a_D^0;
- AD1 - imaginary surface potential diffuseness a_D linear term a_D^1;
- RC - imaginary volume potential radius R_V;
- AC0 - imaginary volume potential diffuseness a_V constant term a_V^0;
- AC1 - imaginary volume potential diffuseness a_V linear term a_V^1.

RW, AW0, AW1, RS, AS0, AS1 - card 14g

- RW - imaginary Gaussian potential radius R_W;
- AW0 - imaginary Gaussian potential diffuseness a_W constant term a_W^0;
- AW1 - imaginary Gaussian potential diffuseness a_W linear term a_W^1;
- RS - spin orbit potential radius R_{SO};
- AS0 - spin orbit potential diffuseness a_{SO} constant term a_{SO}^0;
- AS1 - spin orbit potential diffuseness a_{SO} linear term a_{SO}^1.

RZ, RZBWC, RZWID, AZ, CCOUL, ALF - card 14h

- RZ - equivalent charged ellipsoid radius R_C;
- RZBWC - equivalent charged ellipsoid radius R_C dispersion constant C_C;
- RRWID - equivalent charged ellipsoid radius R_C dispersion width WID_C;
- AZ - charged ellipsoid radius diffuseness a_Z;
- CCOUL - Coulomb correction constant C_{Coul};
- ALF- mixture coefficient for imaginary volume and Gaussian potentials α.

CISO, WCISO,EA,WDSHI, WDWID2 - card 14i

- CISO - constant for real potential isospin term C_{viso};

- WCISO - constant for imaginary surface potential isospin term C_{wiso};
- EA - energy E_a where volume absorption dependence is modified;
- WDSHI - imaginary surface imaginary potential specific formulae constant;
- WDWID2 - imaginary surface imaginary potential specific formulae constant.

ALFNEW,VRD,CAVR,CARR,CAAR,CARD - card 14k

- ALFNEW - surface imaginary potential constant α;
- VRD - imaginary surface potential constant;
- CAVR - coefficient of real potential linear dependence of A-mass number ;
- CARR - coefficient of real radius linear dependence of A-mass number;
- CAAR - coefficient of real diffuseness linear dependence of A-mass number;
- CARD - coefficient of imaginary surface potential radius linear dependence of A-mass number.

CAAC,ABASE,CAWD - card 15

- CAAC - coefficient of imaginary volume potential diffuseness linear dependence of A-mass number;
- ABASE - base A-mass number at which all linear A-dependent terms of optical potential parameters equals zero (e.g. for a nucleus with A mass number real (volume) potential depth is VR+CAVR(A-ABASE));
- CAWD - linear dependence (of A-mass number) coefficient for imaginary surface potential W_D term W_D^{DISP}.

– Record 16 - FORMAT(6E12.7)
Input of even axial coefficients of radii deformations $\beta_{\lambda 0}$ from β_{20} to $\beta_{\lambda 0}$, λ=NPD. This Record is read only for axial rotator model (MEHAM = 1). Note that λ is even and no more than 8. For MEJOB=1 one cart is read, while for MEJOB≥1 MENUC such cards are read
(BET(I), I=2,NPD,2)

> It is the last card of input for optical model calculations (MEJOB = 1), the following cards are used when potential parameters adjustment is desired.

– Record 17 - FORMAT(6I2)
Input of flags that determine which parameters will be adjusted; if NPJ(I) = 1 the chosen parameter will be adjusted. Number of parameters to be adjusted must not exceed 20. Please note, that up to NPJ(50)for users convenience sequence of inputted flags follows sequence of potential parameters.
(NPJ(I), I=1,77) cards 17a,...17m

- NPJ(1) - flag for real optical potential V_R constant term adjustment VR0;
- NPJ(2) - flag for real optical potential V_R linear term adjustment VR1;
- NPJ(3) - flag for real optical potential V_R square term adjustment VR2;
- NPJ(4) - flag for real optical potential V_R cubic term adjustment VR3;
- NPJ(5) - flag for real optical potential V_R exponential term V_R^{DISP}adjustment VRLA;
- NPJ(6) - flag for real optical potential V_R exponential exponential constant λ_R adjustment ALAVR;
- NPJ(7) - flag for imaginary surface potential W_D constant term adjustment WD0;
- NPJ(8) - flag for imaginary surface potential W_D linear term adjustment WD1;

- NPJ(9) - flag for imaginary surface potential W_D linear term W_D^1 for particle incident energies above BNDC=E_{change} adjustment WDA1;
- NPJ(10) - flag for imaginary surface potential W_D dispersion term W_D^{DISP} adjustment WDBW;
- NPJ(11) - flag for imaginary surface potential W_D dispersion width term WID_D adjustment WDWID;
- NPJ(12) - flag for imaginary surface potential W_D exponential constant λ_D adjustment ALAWD;
- NPJ(13) - flag for imaginary volume potential W_V constant term linear term W_V^0 adjustment WC0;
- NPJ(14) - flag for imaginary volume potential W_V linear term W_V^1 adjustment WC1;
- NPJ(15) - flag for imaginary volume potential W_V linear term W_V^1 for particle incident energies above BNDC=E_{change} adjustment WCA1;
- NPJ(16) - flag for imaginary surface potential W_V dispersion term W_V^{DISP} adjustment WCBW;
- NPJ(17) - flag for imaginary surface potential W_V dispersion width term WID_V adjustment WCWID;
- NPJ(18) - flag for energy where linear potential slopes change E_{change} adjustment BNDC;
- NPJ(19) - flag for real spin-orbit potential V_{SO} adjustment VS;
- NPJ(20) - flag for real spin-orbit potential V_{SO} exponential constant λ_{so}adjustment ALASO;
- NPJ(21) - flag for imaginary spin-orbit potential W_{SO} constant term W_{SO}^0 adjustment WSO;
- NPJ(22) - flag for imaginary spin-orbit potential W_{SO} linear term W_{SO}^1 adjustment WS1;
- NPJ(23) - flag for imaginary spin-orbit potential W_{SO} dispersion term W_{SO}^{DISP} adjustment WSBW;
- NPJ(24) - flag for imaginary spin-orbit potential W_{SO} dispersion dispersion width WID_{SO} adjustment WSWID;
- NPJ(25) - flag for real potential radius R_R adjustment RR;
- NPJ(26) - flag for real potential radius R_R dispersion constant C_R adjustment RRBWC;
- NPJ(27) - flag for real potential radius R_R dispersion dispersion width WID_R adjustment RRWID;
- NPJ(28) - flag for dispersion power constant S adjustment PDIS;
- NPJ(29) - flag for real potential diffuseness a_R constant term adjustment AR0;
- NPJ(30) - flag for real potential diffuseness a_R linear term a_R^1adjustment AR1;
- NPJ(31) - flag for imaginary surface potential radius R_D adjustment RD;
- NPJ(32) - flag for imaginary surface potential diffuseness a_D constant term adjustment AD0;
- NPJ(33) - flag for imaginary surface potential diffuseness a_D linear term a_D^1 adjustment AD1;
- NPJ(34) - flag for imaginary volume potential radius R_V adjustment RC;
- NPJ(35) - flag for imaginary volume potential diffuseness a_V constant term adjustment AC0;
- NPJ(36) - flag for imaginary volume potential diffuseness a_V linear term a_V^1 adjustment AC1;

- NPJ(37) - flag for Gaussian potential radius R_W adjustment RW;
- NPJ(38) - flag for Gaussian potential radius diffuseness a_W constant term adjustment AW0;
- NPJ(39) - flag for Gaussian potential radius diffuseness a_W linear term a_W^1 adjustment AW1;
- NPJ(40) - flag for spin-orbit potential radius R_{SO} adjustment RS;
- NPJ(41) - flag for spin-orbit potential diffuseness a_{SO} constant term adjustment AS0;
- NPJ(42) - flag for spin-orbit potential diffuseness a_{SO} linear term a_{SO}^1 adjustment AS1;
- NPJ(43) - flag for equivalent charged ellipsoid radius R_C adjustment RZ;
- NPJ(44) - flag for equivalent charged ellipsoid radius R_C dispersion constant C_C adjustment RZBWC;
- NPJ(45) - flag for equivalent charged ellipsoid radius R_C dispersion width WID_C adjustment RZWID;
- NPJ(46) - flag for equivalent charged ellipsoid radius R_C diffuseness a_Z adjustment AZ;
- NPJ(47) - flag for Coulomb correction constant adjustment CCOUL;
- NPJ(48) - flag for mixture coefficient α for imaginary volume and Gaussian potentials adjustment ALF;
- NPJ(49) - flag for real potential isospin constant C_{viso} adjustment CISO;
- NPJ(50) - flag for imaginary surface potential isospin constant C_{wiso} adjustment WCISO;
- NPJ(51) - flag for imaginary volume potential isospin constant C_{wdiso} adjustment WDISO;
- NPJ(52) - flag for energy E_a where volume absorption is modified adjustment EA;
- NPJ(53) - flag for imaginary surface imaginary potential specific formulae adjustment WDSHI;
- NPJ(54) - flag for imaginary surface imaginary potential specific formulae adjustment WDWID2;
- NPJ(55) - flag for surface imaginary potential constant α adjustment ALFNEW;
- NPJ(56) - flag for imaginary potential constant adjustment VRD;
- NPJ(57) - flag for equilibrium deformation β_{20} for non-axial Hamiltonian model adjustment BET0 for MEBET isotope;
- NPJ(58) - flag for equilibrium deformation β_{30} for non-axial Hamiltonian adjustment BET3 for MEBET isotope;
- NPJ(59) - flag for rigid deformation β_4 for non-axial Hamiltonian model adjustment BET4 for MEBET isotope;
- NPJ(60) - flag for rotational model axial rigid deformation β_{20} adjustment BET(2) for MEBET isotope;
- NPJ(61) - flag for rotational model axial rigid deformation β_{40} adjustment BET(4) for MEBET isotope;
- NPJ(62) - flag for rotational model axial rigid deformation β_{60} adjustment BET(6) for MEBET isotope;
- NPJ(63) - flag for nuclear softness $\mu_{\beta_3} = \mu_\varepsilon$ adjustment AMU0;
- NPJ(64) - flag for nuclear softness μ_{γ_0} adjustment AMG0;
- NPJ(65) - flag for coefficient of real potential linear dependence of A-mass number adjustment CAVR;

- NPJ(66) - flag for coefficient of real radius linear dependence of A-mass number adjustment CARR;
- NPJ(67) - flag for coefficient of real diffuseness linear dependence of A-mass number adjustments CAAR;
- NPJ(68) - flag for coefficient of surface imaginary radius linear dependence of A-mass number adjustment CARD ;
- NPJ(69) - flag for coefficient of volume imaginary diffuseness linear dependence of A-mass number adjustment CAAC;
- NPJ(70) - not used now;
- NPJ(71) - not used now;
- NPJ(72) - not used now;
- NPJ(73) - flag for deformations for level from other bands BETB for level MELEV and isotope MEBET;
- NPJ(74) - flag quadrupole non-axiality γ_0 GAMOIS for isotope isotope MEBET;
- NPJ(75) - flag for quadrupole softness μ_{β_2} AMBO for isotope isotope MEBET;
- NPJ(76) - flag for linear dependence (of A-mass number) coefficient for imaginary surface potential CAWD ;
- NPJ(77) - not used now.

Next block of cards will be read for each isotope **MENUC** times and for each isotope for each energy point **EE(I)**, that means **NST** blocks.

- Record 18 - FORMAT(8I2)
  Input of flags determining which experimental data will be used in parameters adjustment (flag = 1 means used in adjustment) for the current energy EE(I) .
  NT(I), NR(I), NGN(I), NGD(I), NSF1(I), NSF2(I), NRAT(I), NNAT(I)
  - NT(I) - flag of total cross section;
  - NR(I) - flag of reaction cross section;
  - NGN(I) - flag of integral excitation cross section of a group of levels, number of such groups, NGN(I) must be no more than 5;
  - NGD(I) - flag of angular distributions of scattered neutrons with excitation of a group of levels, number of such groups, NGD(I) must be no more than 5;
  - NSF1(I) - flag of S_0 strength function;
  - NSF2(I) - flag of S_1 strength function;
  - NRAT(I)- flag of total ratio. NRAT (I) number (this flag is not 1!!!) ratio with which isotope should be calculated
  - NNAT(I)- flag of natural isotope mixture total cross section.
- Record 19 - FORMAT(6E12.7)
  Experimental data for total and reaction cross sections and totals ratio for current energy, if flag = 0 may be blank.
  STE(I), DST(I), SRE(I), DSR(I),RATIO(I), DRAT(I)
  - STE(I) - experimental total cross section;
  - DST(I) - experimental total cross section error;
  - SRE(I) - experimental reaction cross section;
  - DSR(I) - experimental reaction cross section error;
  - RATIO(I) - experimental totals ratio;
  - DRAT(I)- experimental totals error.

– Record 20 - FORMAT(2E12.7)
Experimental data for natural isotope mixture total cross section for current energy, if NNAT(I) = 0 Record is not read.
CSNAT(I), DCSNAT(I)
  – CSNAT(I)- experimental natural mixture cross section;
  – DCSNAT(I)experimental natural mixture cross section error.
– Record 21 - FORMAT(2E12.7)
Experimental data for strength functions, if NSF1(I) = 0 this Record is not read.
SE1(I), DS1(I), SE2(I), DS2(I)
  – SE1(I) - experimental S_0 strength function;
  – DS1(I) - experimental S_0 strength function error;
  – SE2(I) - experimental S_1 strength function;
  – DS2(I) - experimental S_1 strength function error.
– Record 22 - FORMAT(2E12.7,2I2), cards 16a, 16b, ...
Experimental data for integral excitation of groups of levels for current energy, each card is read for the group of excited levels, that means NGN(I) times, if NGN(I) = 0 - these cards are not read. Number of groups must not exceed 5.
(SNE(I,K), DSN(I,K), NIN(I,K), NFN(I,K), K=1,NGN(I))
  – SNE(I,K) - experimental integral cross section of a group of levels;
  – DSN(I,K) - experimental integral cross section error of a group of levels;
  – NIN(I,K) - the number of the first excited level in a group as specified in Record 8;
  – NFN(I,K) - the number of the last excited level in a group as specified in Record 8.
– Record 20 - FORMAT(15I2)
Description of experimental data for angular distributions of scattered neutron with excitation of a group of levels, if NGD(I) = 0, this Record is not read. Number of groups must not exceed 5.
(NID(I,K), NFD(I,K), MTD(I,K), K =1,NGD(I))
  – NID(I,K) - the number of the first excited level in a group as specified in Record 8;
  – NFD(I,K) - the number of the last excited level in a group as specified in Record 8;
  – MTD(I,K) - number of angles in which experimental angular distributions with excitation of a group of levels exist.
– Record 23 - FORMAT(6E12.7), cards 18a, 18b, ...
Experimental angular distribution with excitation of a group of levels, this block of cards is read NGD(I) times, if NGD(I)=0, this Record is not read.
(TED(I,K,L), SNGD(I,K,L), DSD(I,K,L), L=1,MTD(I,K)) Cards 23a, 23b,...
  – TED(I,K,L) - center-of-mass angles for angular distribution in degrees;
  – SNGD(I,K,L) - experimental differential cross section in b/sr;
  – DSD(I,K,L) - experimental differential cross section error in b/sr.
– Record 24 - FORMAT(6E12.7), cards 24a, 24b,...
Estimated accuracy of parameter adjustment
(EP(I), I= 1,NV)
  – EP(I) - absolute accuracy for a parameter with i^{th} flag=1, NV is equal to a number of flags=1. Number of flags =1 must not exceed 20.

– Record 25 - FORMAT(E12.7)
Initial value of χ^2 if known. If equal 0.000000E+00 - will start from calculating of initial value χ^2.

This is the last card in input.