1 Modified GEF file 'ReadParameters.mac'.

The following is the modified, extended copy of the file 'ReadParameter.mac' from the GEF source code (GEF version 2023/1.1) that is used to perturb the GEF parameters for the McPUFF simulations. The modifications made to the source file are highlighted in yellow. During the execution of the McPUFF program, GEF uses this file to replace default parameter values with the parameter values provided by the user.

```
Do While Instr(Cline,"/"+"'") > 0 ' Remove limited comments
  Cline = Trim(Cline)
  Ileft = Instr(Cline,"/"+"'")
  Iright = Instr(Cline,"'"+"/")
  If Ileft < Iright Then
    Cline = Mid(Cline,1,Ileft-1) + Mid(Cline,Iright+2)
  End If
Loop
Cline = Trim(Cline)
If Instr(Cline,"'") > 0 Then ' Remove text after comment sign
  Cline = Mid(Cline,1,Instr(Cline,"'")-1)
  Cline = Trim(Cline)
End If
If Cline <> "" Then
If Instr(Cline,"=") > 0 Then
    Print Cline
  Ndiv = CC_Count(Cline, "=")
  If Ndiv = 2 Then
    CC_Cut(Cline, "=", Cdiv(), N)
    Cpar = Ucase(Trim(Cdiv(1)))
    Valpar = Val(Trim(Cdiv(2)))
    'Print Cpar,Valpar
    Select Case Cpar
    Case "_DELTA_S0"                ': print _Delta_S0 - Valpar
        _Delta_S0 = Valpar
    Case "CHISQR_FIT_PRESENT"
        Chisqr_Fit_min = Valpar
    Case "_P_DZ_MEAN_S1"            ': print _P_DZ_Mean_S1 - Valpar
        _P_DZ_Mean_S1 = Valpar
    Case "_P_CORR_S1"               ': print _P_corr_S1 - Valpar
        _P_corr_S1 = Valpar
    Case "_P_DZ_MEAN_S2"            ': print _P_DZ_Mean_S2 - Valpar
        _P_DZ_Mean_S2 = Valpar
    Case "_P_DZ_MEAN_S3"            ': print _P_DZ_Mean_S3 - Valpar
        _P_DZ_Mean_S3 = Valpar
    Case "_P_DZ_MEAN_S4"            ': print _P_DZ_Mean_S4 - Valpar
        _P_DZ_Mean_S4 = Valpar
    Case "ZC_MODE_4L"               ': print ZC_Mode_4L - Valpar
        ZC_Mode_4L = Valpar
    Case "_P_Z_CURV_S1"             ': print _P_Z_Curv_S1 - Valpar
        _P_Z_Curv_S1 = Valpar
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Case "P_Z_CURVMOD_S1"           ': print P_Z_Curvmod_S1 - Valpar
    P_Z_Curvmod_S1 = Valpar
Case "_P_Z_CURV_S2"            ': print _P_Z_Curv_S2 - Valpar
    _P_Z_Curv_S2 = Valpar
Case "_S2LEFTMOD"              ': print _S2leftmod - Valpar
    _S2leftmod = Valpar
Case "P_Z_CURVMOD_S2"          ': print P_Z_Curvmod_S2 - Valpar
    P_Z_Curvmod_S2 = Valpar
Case "_P_A_WIDTH_S2"           ': print _P_A_Width_S2 - Valpar
    _P_A_Width_S2 = Valpar
Case "_P_Z_CURV_S3"            ': print _P_Z_Curv_S3 - Valpar
    _P_Z_Curv_S3 = Valpar
Case "P_Z_CURVMOD_S3"          ': print P_Z_Curvmod_S3 - Valpar
    P_Z_Curvmod_S3 = Valpar
Case "P_Z_CURV_SL4"            ': print P_Z_Curv_SL4 - Valpar
    P_Z_Curv_SL4 = Valpar
Case "P_Z_SIGMA_SL4"           ': print P_Z_Sigma_SL4 - Valpar
    P_Z_Sigma_SL4 = Valpar
Case "_P_Z_CURV_S4"           ': print _P_Z_Curv_S4 - Valpar
    _P_Z_Curv_S4 = Valpar
Case "P_Z_CURVMOD_S4"          ': print P_Z_Curvmod_S4 - Valpar
    P_Z_Curvmod_S4 = Valpar
Case "_P_SHELL_S1"             ': print _P_Shell_S1 - Valpar
    _P_Shell_S1 = Valpar
Case "_P_SHELL_S2"             ': print _P_Shell_S2 - Valpar
    _P_Shell_S2 = Valpar
Case "_P_SHELL_S3"             ': print _P_Shell_S3 - Valpar
    _P_Shell_S3 = Valpar
Case "P_SHELL_SL4"              ': print P_Shell_SL4 - Valpar
    P_Shell_SL4 = Valpar
Case "_P_SHELL_S4"             ': print _P_Shell_S4 - Valpar
    _P_Shell_S4 = Valpar
Case "P_S4_MOD"                 ': print P_S4_mod - Valpar
    P_S4_mod = Valpar
Case "_PZ_S3_OLAP_POS"         ': print _PZ_S3_olap_pos - Valpar
    _PZ_S3_olap_pos = Valpar
Case "_PZ_S3_OLAP_CURV"        ': print _PZ_S3_olap_curv - Valpar
    _PZ_S3_olap_curv = Valpar
Case "ETHRESHSUPPS1"           : print ETHRESHSUPPS1 - Valpar
    ETHRESHSUPPS1 = Valpar
Case "ESIGSUPPS1"              ': print ESIGSUPPS1 - Valpar
    ESIGSUPPS1 = Valpar
Case "LEVEL_S11"               ': print Level_S11 - Valpar
    Level_S11 = Valpar
Case "SHELL_FADING"            ': print Shell_fading - Valpar
    Shell_fading = Valpar
Case "_T_LOW_S1"               ': print _T_low_S1 - Valpar
    _T_low_S1 = Valpar
Case "_T_LOW_S2"               ': print _T_low_S2 - Valpar
    _T_low_S2 = Valpar
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Case "_T_LOW_S3"            ': print _T_low_S3 - Valpar
    _T_low_S3 = Valpar
Case "_T_LOW_S4"            ': print _T_low_S4 - Valpar
    _T_low_S4 = Valpar
Case "_T_LOW_SL"            ': print _T_low_SL - Valpar
    _T_low_SL = Valpar
Case "T_LOW_S11"            ': print T_low_S11 - Valpar
    T_low_S11 = Valpar
Case "_P_ATT_POL"           ': print _P_att_pol - Valpar
    _P_att_pol = Valpar
Case "P_ATT_POL2"           ': print P_att_pol2 - Valpar
    P_att_pol2 = Valpar
Case "P_ATT_POL3"           ': print P_att_pol3 - Valpar
    P_att_pol3 = Valpar
Case "_P_ATT_REL"           ': print _P_att_rel - Valpar
    _P_att_rel = Valpar
Case "_DE_DEFO_S1"          ': print _dE_Defo_S1 - Valpar
    _dE_Defo_S1 = Valpar
Case "_DE_DEFO_S2"          ': print _dE_Defo_S2 - Valpar
    _dE_Defo_S2 = Valpar
Case "_DE_DEFO_S3"          ': print _dE_Defo_S3 - Valpar
    _dE_Defo_S3 = Valpar
Case "_DE_DEFO_S4"          ': print _dE_Defo_S4 - Valpar
    _dE_Defo_S4 = Valpar
Case "_BETAL0"              ': print _betaL0 - Valpar
    _betaL0 = Valpar
Case "_BETAL1"              ': print _betaL1 - Valpar
    _betaL1 = Valpar
Case "_BETAH0"              ': print _betaH0 - Valpar
    _betaH0 = Valpar
Case "_BETAH1"              ': print _betaH1 - Valpar
    _betaH1 = Valpar
Case "_DBETA_S3"            ': print _dbeta_S3 - Valpar
    _dbeta_S3 = Valpar
Case "KAPPA"                ': print kappa - Valpar
    kappa = Valpar
Case "TCOLLFRAC"            ': print TCOLLFRAC - Valpar
    TCOLLFRAC = Valpar
Case "_ECOLLFRAC"           ': print _ECOLLFRAC - Valpar
    _ECOLLFRAC = Valpar
Case "TFCOLL"               ': print TFCOLL - Valpar
    TFCOLL = Valpar
Case "TCOLLMIN"             ': print TCOLLMIN - Valpar
    TCOLLMIN = Valpar
Case "ESHIFTSASCI_INTR"      ': print ESHIFTSASCI_intr - Valpar
    ESHIFTSASCI_intr = Valpar
Case "ESHIFTSASCI_COLL"      ': print ESHIFTSASCI_coll - Valpar
    ESHIFTSASCI_coll = Valpar
Case "_EDISSFRAC"           ': print _EDISSFRAC - Valpar
    _EDISSFRAC = Valpar
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    Case "EPOT_SHIFT"              ': print Epot_shift - Valpar
        Epot_shift = Valpar
    Case "SIGDEFO"                 ': print SIGDEFO - Valpar
        SIGDEFO = Valpar
    Case "SIGDEFO_0"               ': print SIGDEFO_0 - Valpar
        SIGDEFO_0 = Valpar
    Case "SIGDEFO_SLOPE"           ': print SIGDEFO_slope - Valpar
        SIGDEFO_slope = Valpar
    Case "SIGENECK"                ': print SIGENECK - Valpar
        SIGENECK = Valpar
    Case "EEXCSIGREL"              ': print EexcSIGrel - Valpar
        EexcSIGrel = Valpar
    Case "DNECK"                   ': print DNECK - Valpar
        DNECK = Valpar
    Case "FTRUNC50"                ': print FTRUNC50 - Valpar
        FTRUNC50 = Valpar
    Case "ZTRUNC50"                ': print ZTRUNC50 - Valpar
        ZTRUNC50 = Valpar
    Case "FTRUNC28"                ': print FTRUNC28 - Valpar
        FTRUNC28 = Valpar
    Case "ZTRUNC28"                ': print ZTRUNC28 - Valpar
        ZTRUNC28 = Valpar
    Case "ZMAX_S2"                 ': print ZMAX_S2 - Valpar
        ZMAX_S2 = Valpar
    Case "NTRANSFEREO"              ': print NTRANSFEREO - Valpar
        NTRANSFEREO = Valpar
    Case "NTRANSFERE"              ': print NTRANSFERE - Valpar
        NTRANSFERE = Valpar
    Case "CSORT"                   ': print Csort - Valpar
        Csort = Valpar
    Case "PZ_EO_SYMM"                ': print PZ_EO_Symm - Valpar
/' Even-odd effect in Z at symmetry '/
        PZ_EO_symm = Valpar
    Case "PN_EO_SYMM"                ': print PN_EO_Symm - Valpar
/' Even-odd effect in N at symmetry '/
        PN_EO_Symm = Valpar
    Case "R_EO_THRESH"               ': print R_EO_THRESH - Valpar
/' Threshold for asymmetry-driven even-odd effect'/
        R_EO_THRESH = Valpar
    Case "R_EO_SIGMA"                ': print R_EO_SIGMA - Valpar
        R_EO_SIGMA = Valpar
    Case "R_EO_MAX"                  ': print R_EO_Max - Valpar
        R_EO_Max = Valpar
    Case "_POLARADD"                 ': print _POLARadd - Valpar
        _POLARadd = Valpar
    Case "POLARFAC"                  ': print POLARfac - Valpar
        POLARfac = Valpar
    Case "T_POL_RED"                 ': print T_POL_RED - Valpar
        T_POL_RED = Valpar
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    Case "_HOMPOL"                    ': print _HOMPOL - Valpar
        _HOMPOL = Valpar
    Case "ZPOL1"                      ': print ZPOL1 - Valpar
        ZPOL1 = Valpar
    Case "P_N_X"                      ': print P_n_x - Valpar
        P_n_x = Valpar
    Case "TSCALE"                     ': print Tscale - Valpar
        Tscale = Valpar
    Case "ECOND"                      ': print Econd - Valpar
        Econd = Valpar
    Case "ETRANS"                     ': print Etrans - Valpar
        Etrans = Valpar
    Case "T_ORBITAL"                  ': print T_orbital - Valpar
        T_orbital = Valpar
    Case "_JSCALING"                  ': print _Jscaling - Valpar
        _Jscaling = Valpar
    Case "SPIN_ODD"                   ': print Spin_odd - Valpar
        Spin_odd = Valpar
    Case "ESORT_EXTEND"               ': print Esort_extend - Valpar
        Esort_extend = Valpar
    Case "ESORT_SLOPE"                ': print Esort_slope - Valpar
        Esort_slope = Valpar
    Case "ESORT_SLOPE_S0"             ': print Esort_slope_S0 - Valpar
        Esort_slope_S0 = Valpar
    Case "EOSCALE"                   ': print EOscale - Valpar
        EOscale = Valpar
    Case "D_PAR_FAC"                  ': print _P_DZ_Mean_S1 - Valpar
        D_Par_Fac = Valpar
    Case Else
        Print "<E> Readparameters.mac: Parameter "+Cpar+" not defined."
    End Select
  Else
    Print "<E> Syntax error in " + Cline + " ."
  End If
Else
  Print "<E> Syntax error in "+Cline+" ."
End If
End If
```
