User Differential Cross Sections for Two-Body reactions

v.9.6.46
from 06/24/13

Requests by
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O.Kirsebom (TRIUMF)

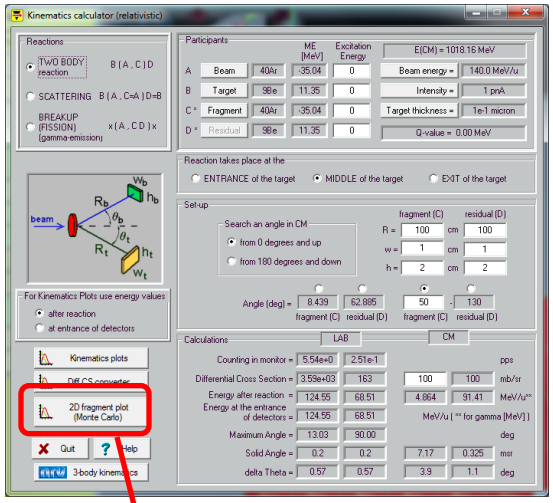
Update
V.9.6.54
From 06/30/13

UserDiffCS ≡ User Differential Cross Sections

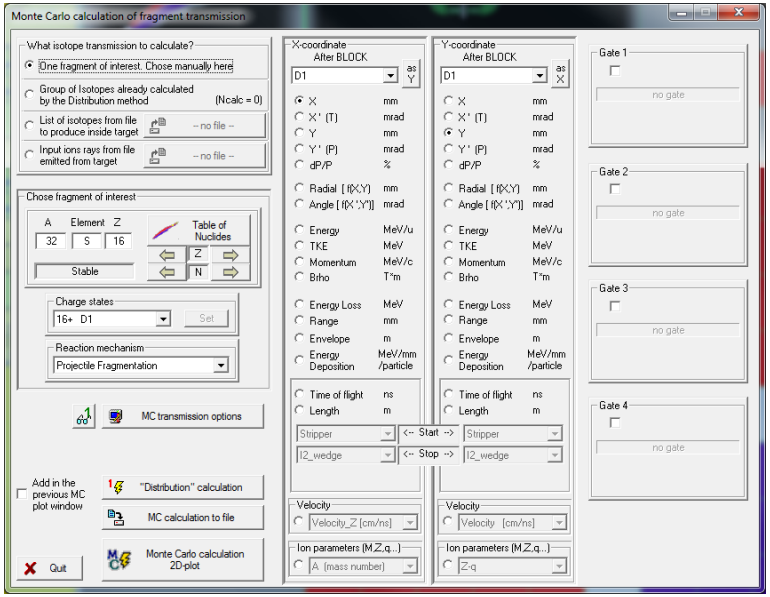
1. Some definitions and links on files used in this document
2. How to load the "UserDiffCS" utility
3. UserDiffCS dialog
4. UserDiffCS plots (cross sections and kinematics)
5. UserDiffCS in the MC 2d-kinematics
6. New parameters the MC transmission dialog
7. Modifications in the MC transmission dialog for two-body reactions
8. UserDiffCS in LISE++ files (save and restore) *(version 9.6.54)*
9. Use UserDiffCS in MC transmission for two-body reactions *(version 9.6.54)*
10. Next steps in UserDiffCS development

1. Some definitions and links on files used in this document

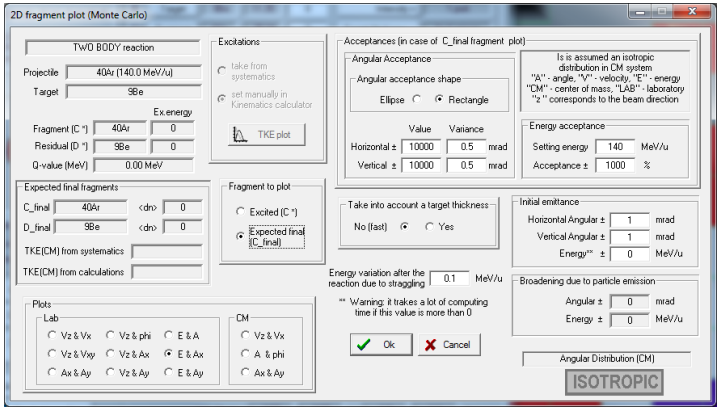
Kinematics Calculator



MC Transmission



MC Kinematics



LISE++ files:

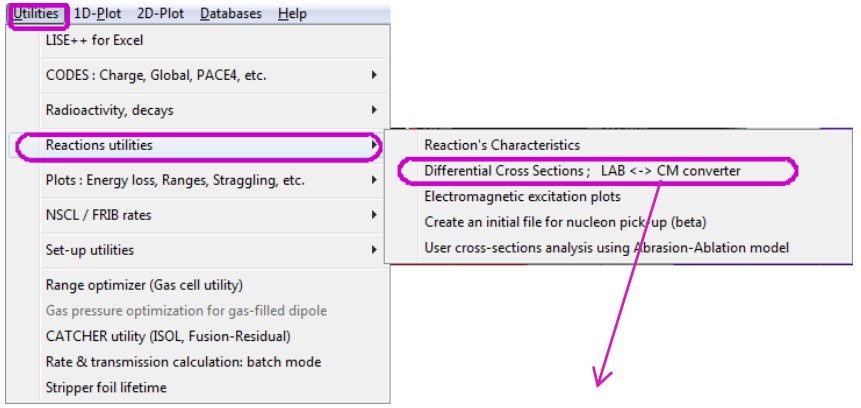
d + ^{18}O -> p + ^{19}O	http://lise.nscl.msu.edu/9_6/DifCS/d_18O.lpp
^{3}He + d -> p + a	http://lise.nscl.msu.edu/9_6/DifCS/d_3He.lpp

DiffCS Files:

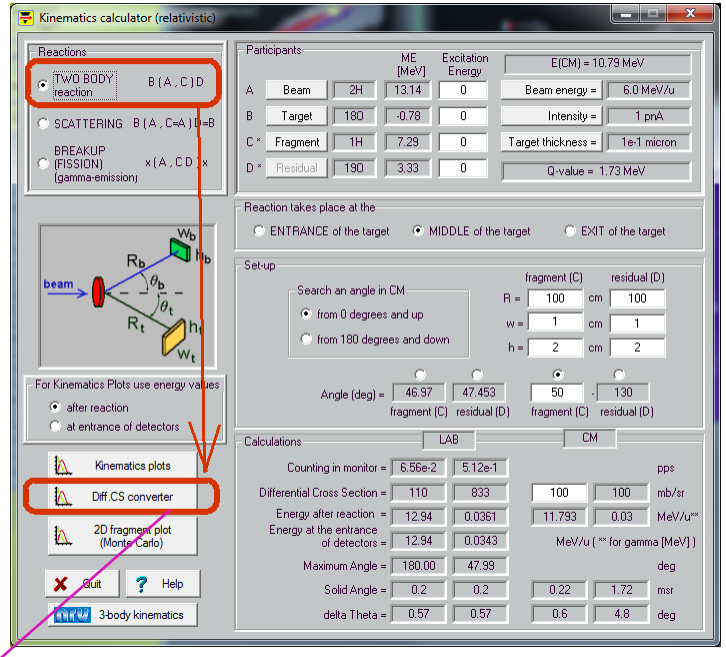
Ground State :	http://lise.nscl.msu.edu/9_6/DifCS/19O_gs.txt
At 0.96 MeV :	http://lise.nscl.msu.edu/9_6/DifCS/19O_L0.96.txt
Isotropical distribution:	http://lise.nscl.msu.edu/9_6/DifCS/19O_isotropic.txt

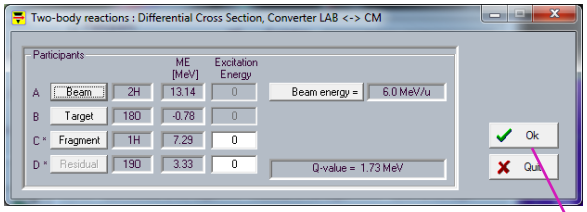
2. How to load the "UserDiffCS" utility

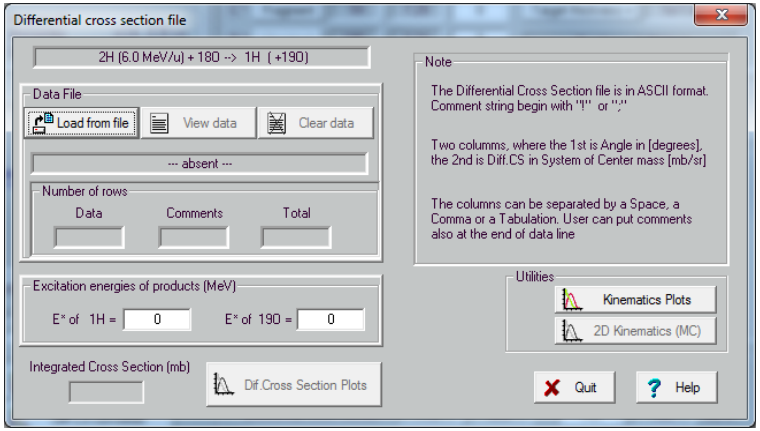
1. "Utilities" menu



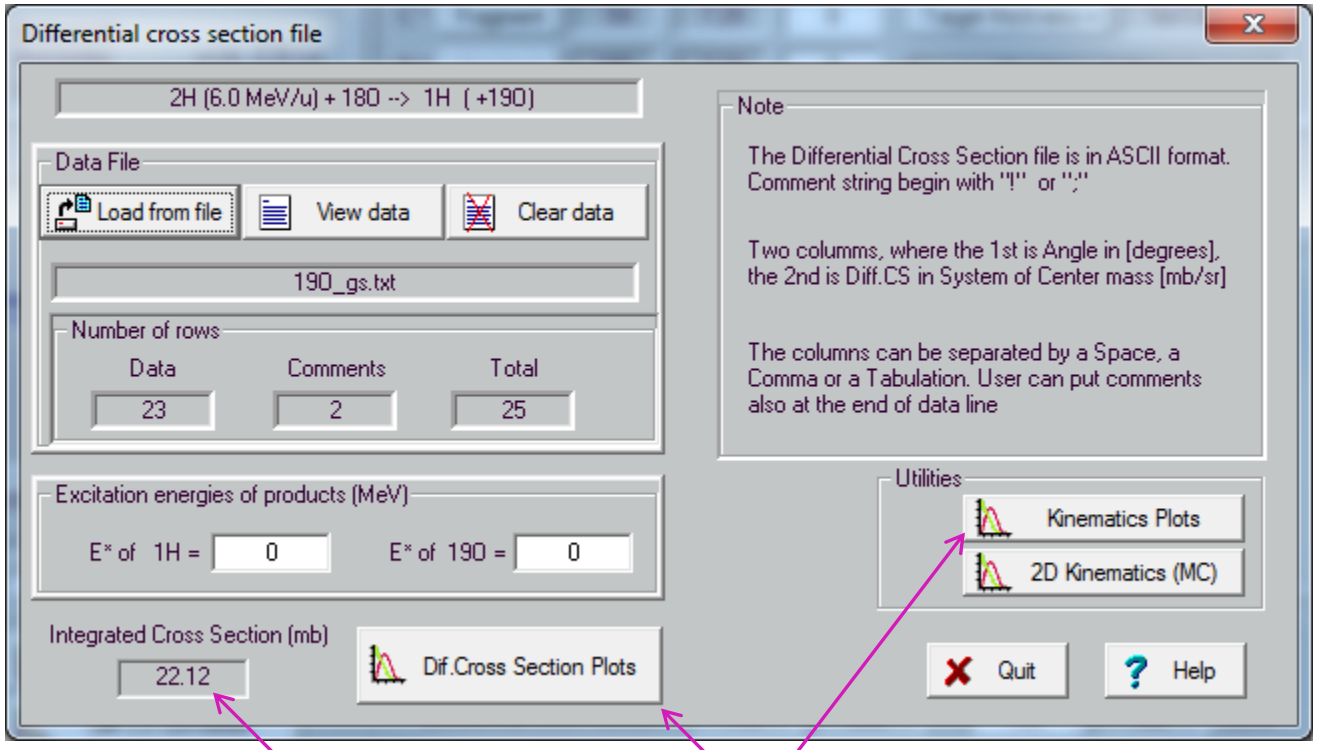
2. Kinematics calculator







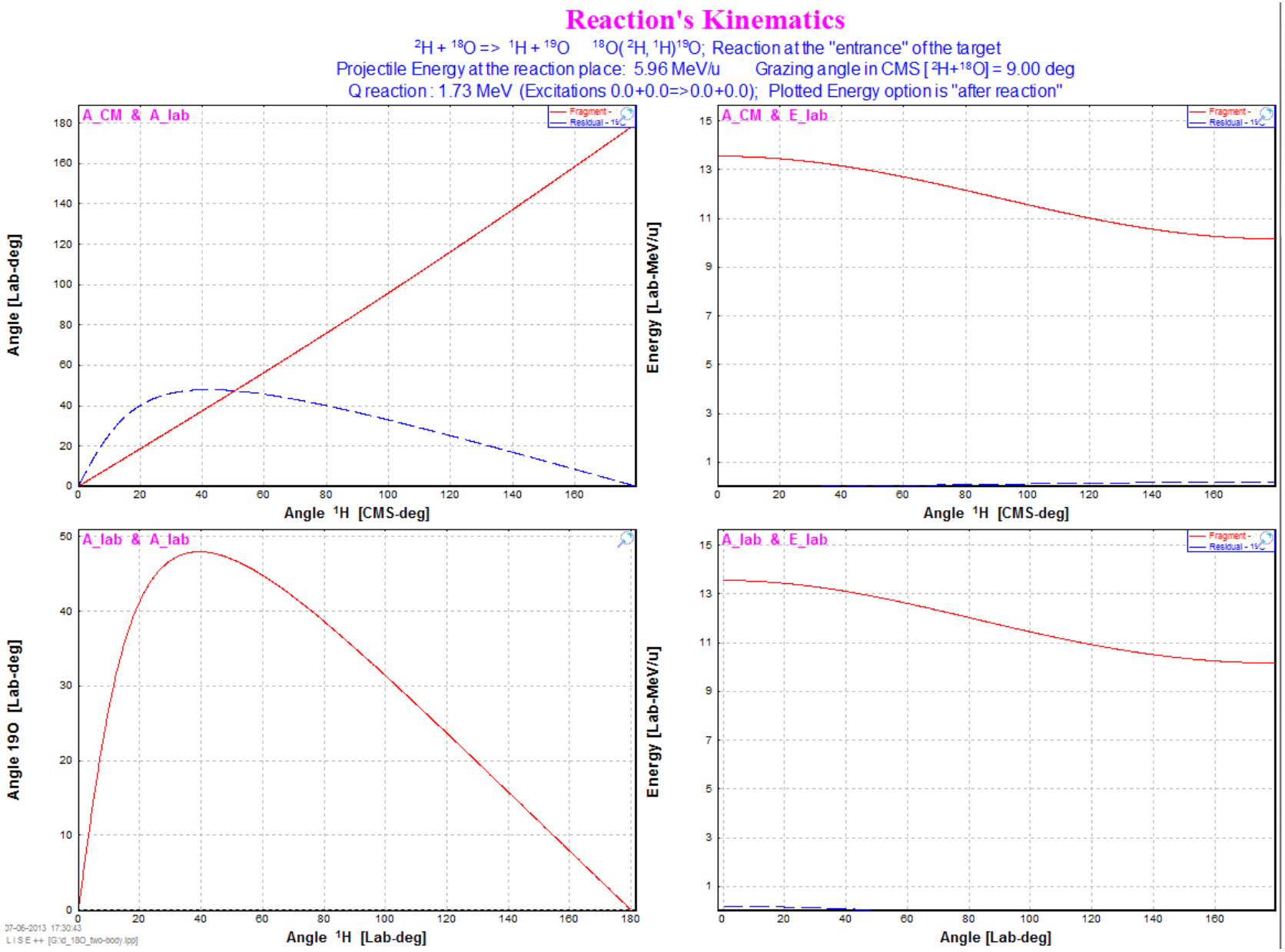
User Diff Cs file is $d\sigma / d\Omega$ (mb/sr) in CMS



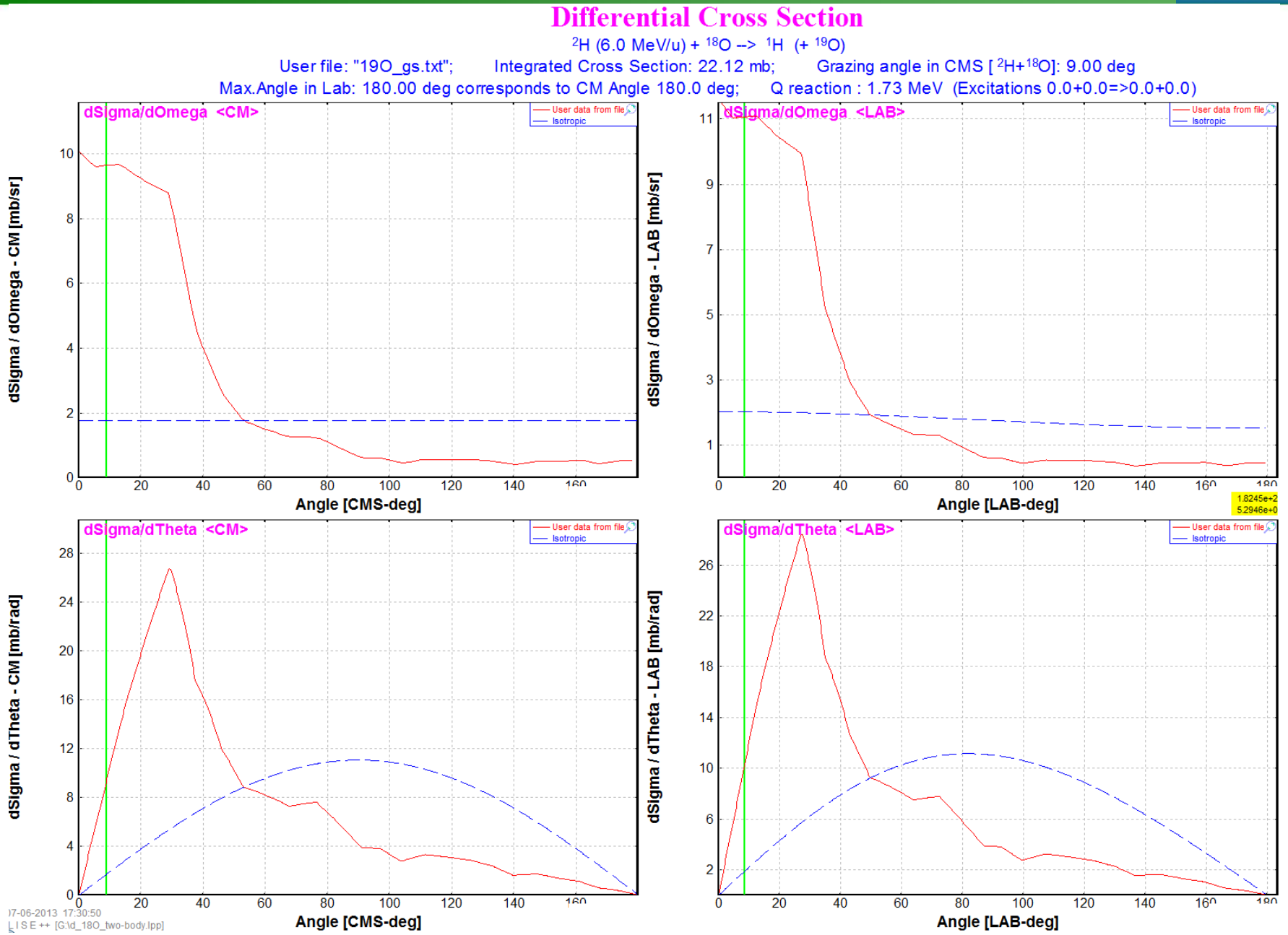
LISE++ automatically integrates the UserDiffCS (dSigma/ dTheta)

These buttons become enable after the UserDiffCS file loaded

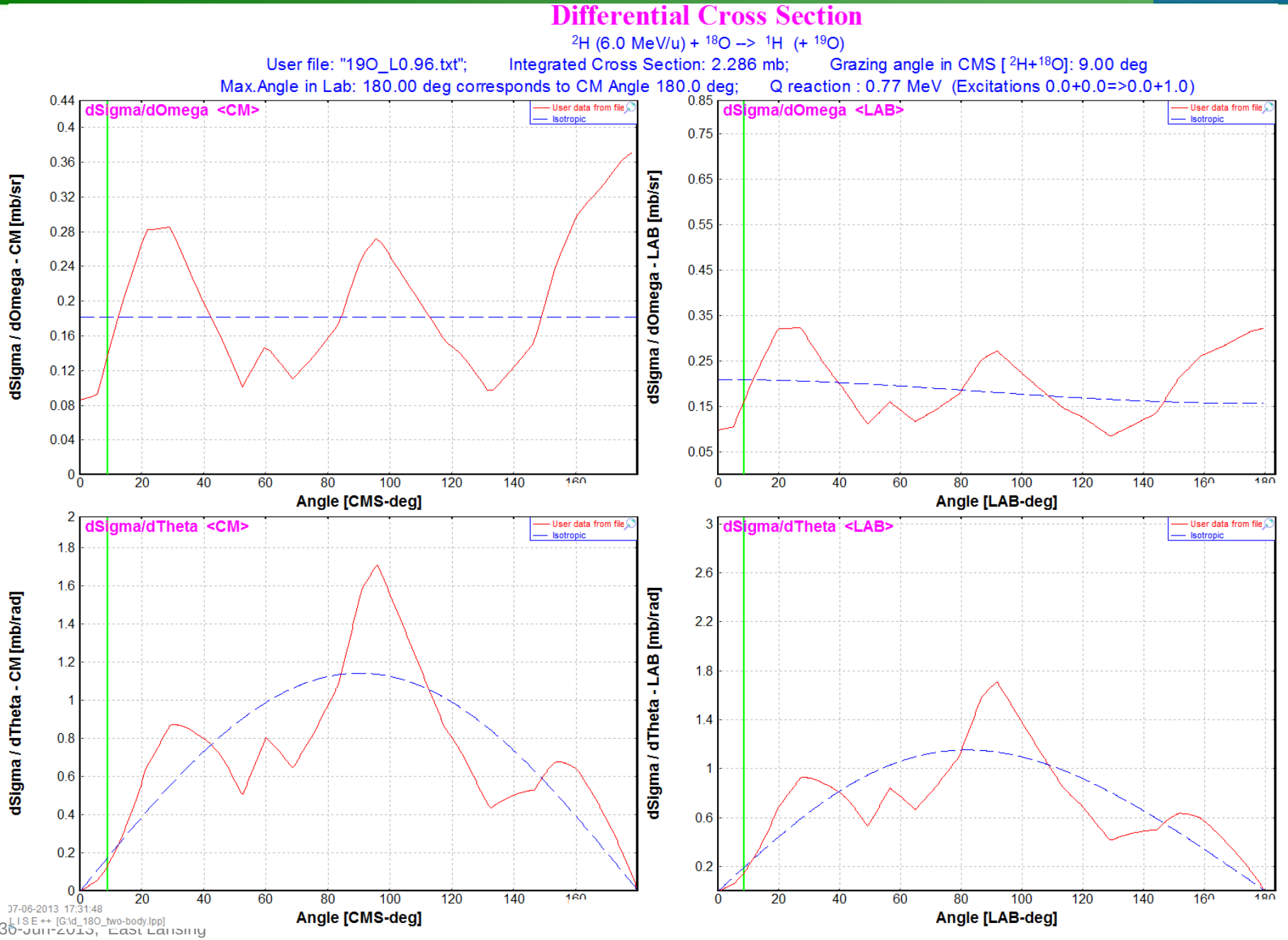
4. The UserDiffCS dialog plots : kinematics



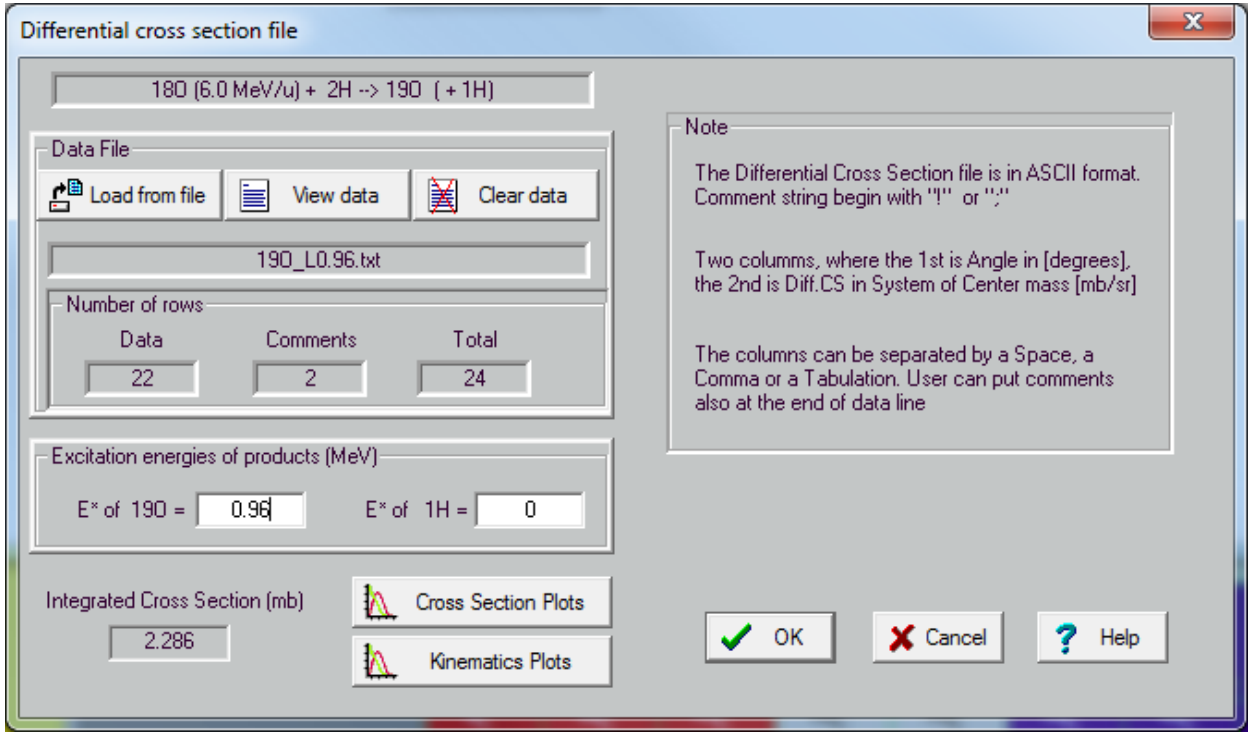
4. The UserDiffCS dialog plots : cross sections (file "19O_gs.txt", E*=0)



The UserDiffCS dialog plots : cross sections (file "19O_L0.96.txt", E*=0.96)



Inverse for test



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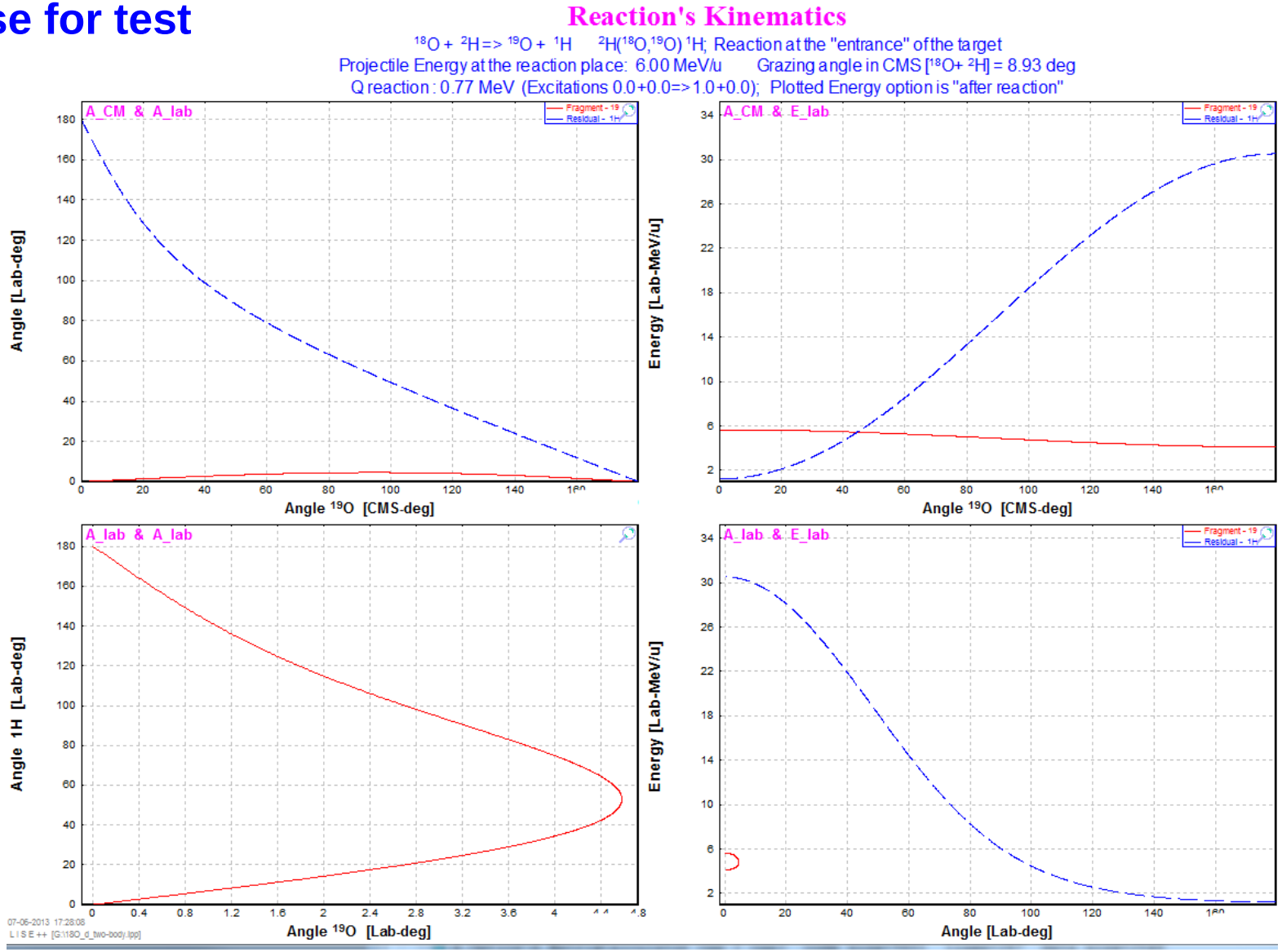
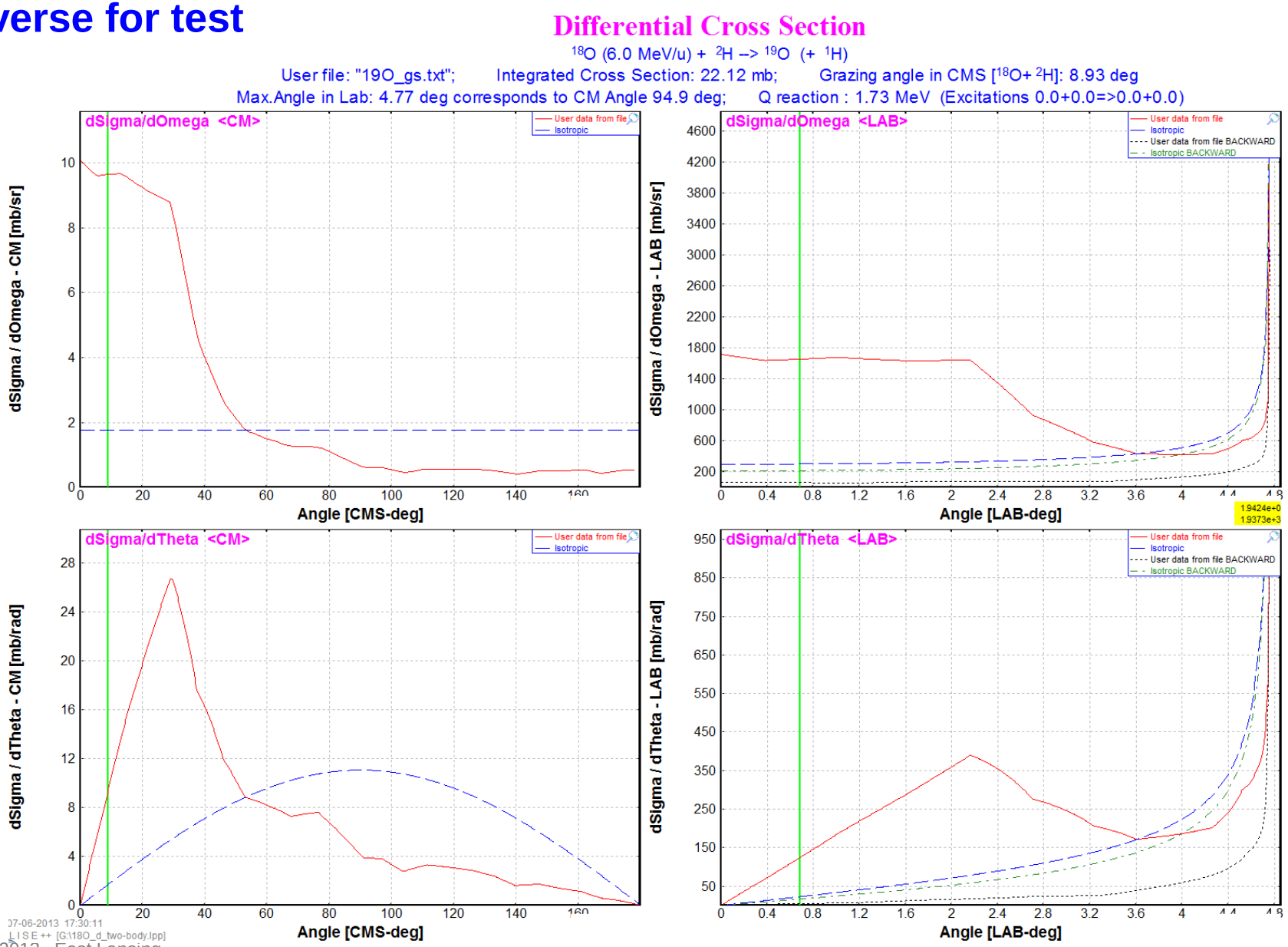
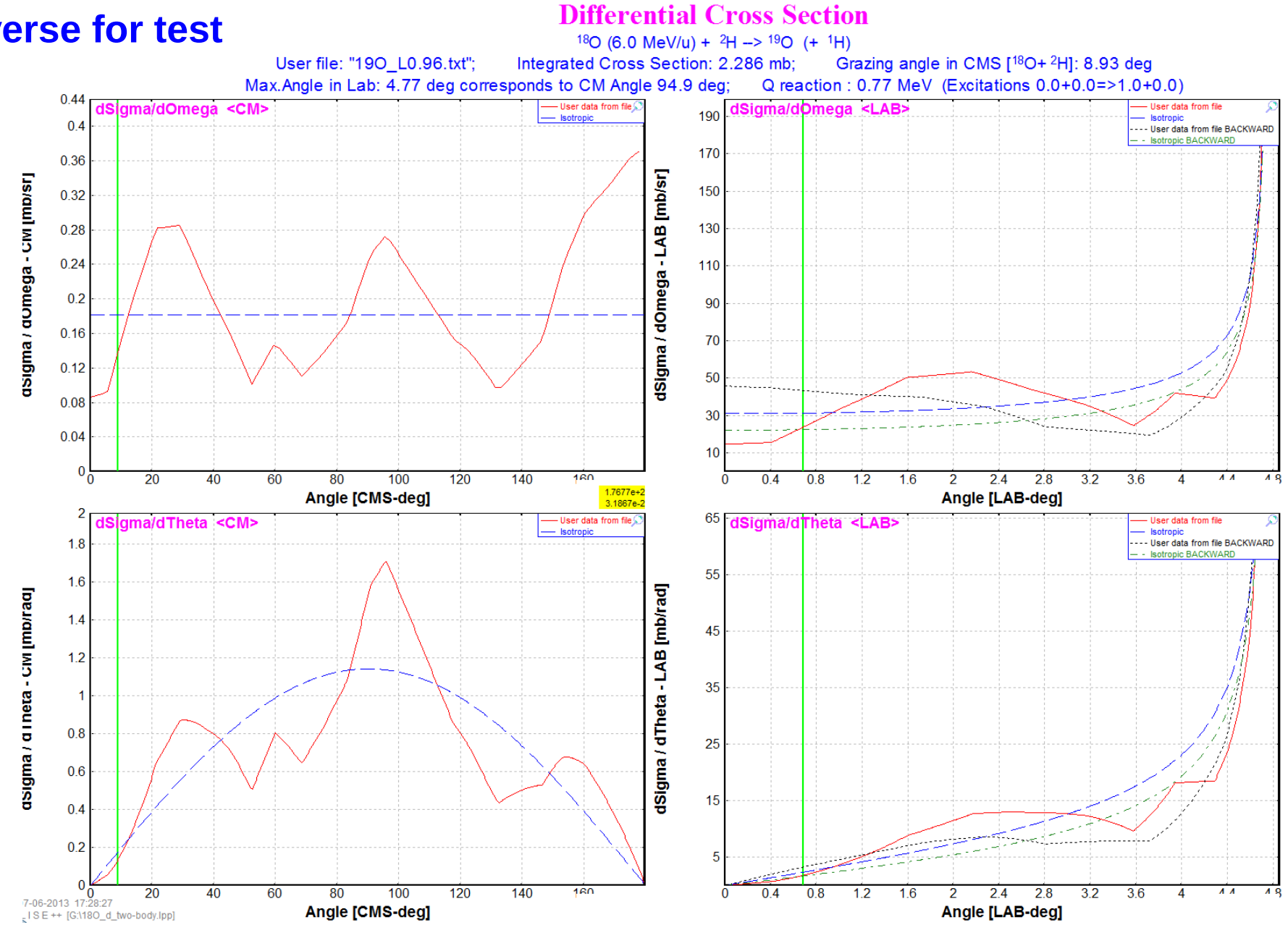


Inverse for test

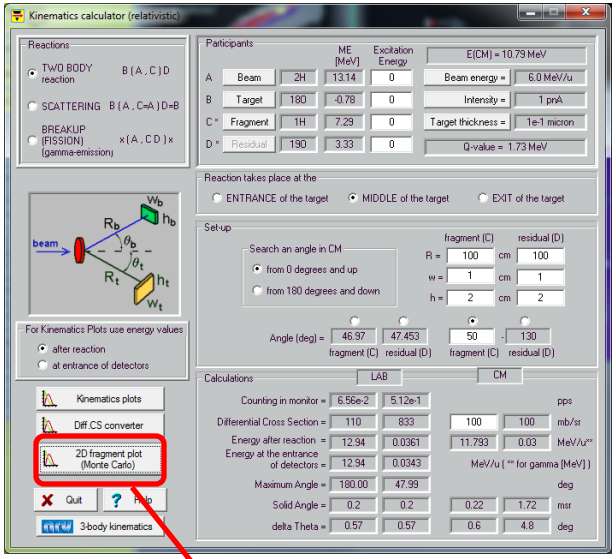


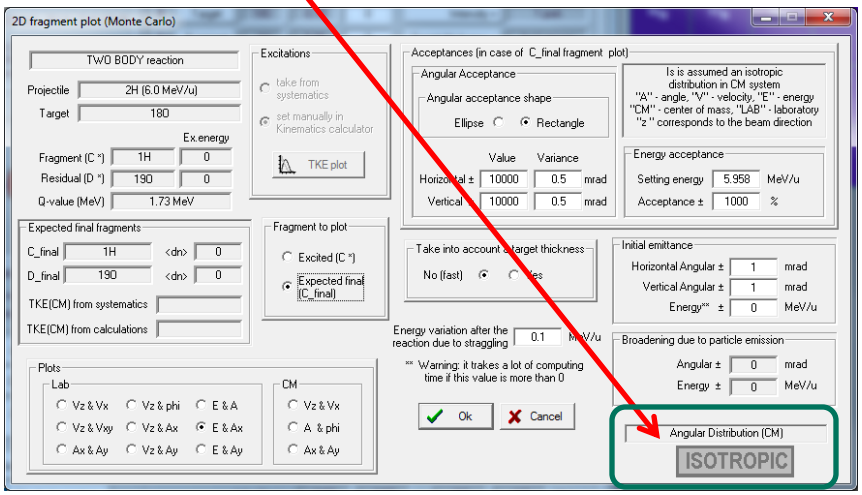
Inverse for test



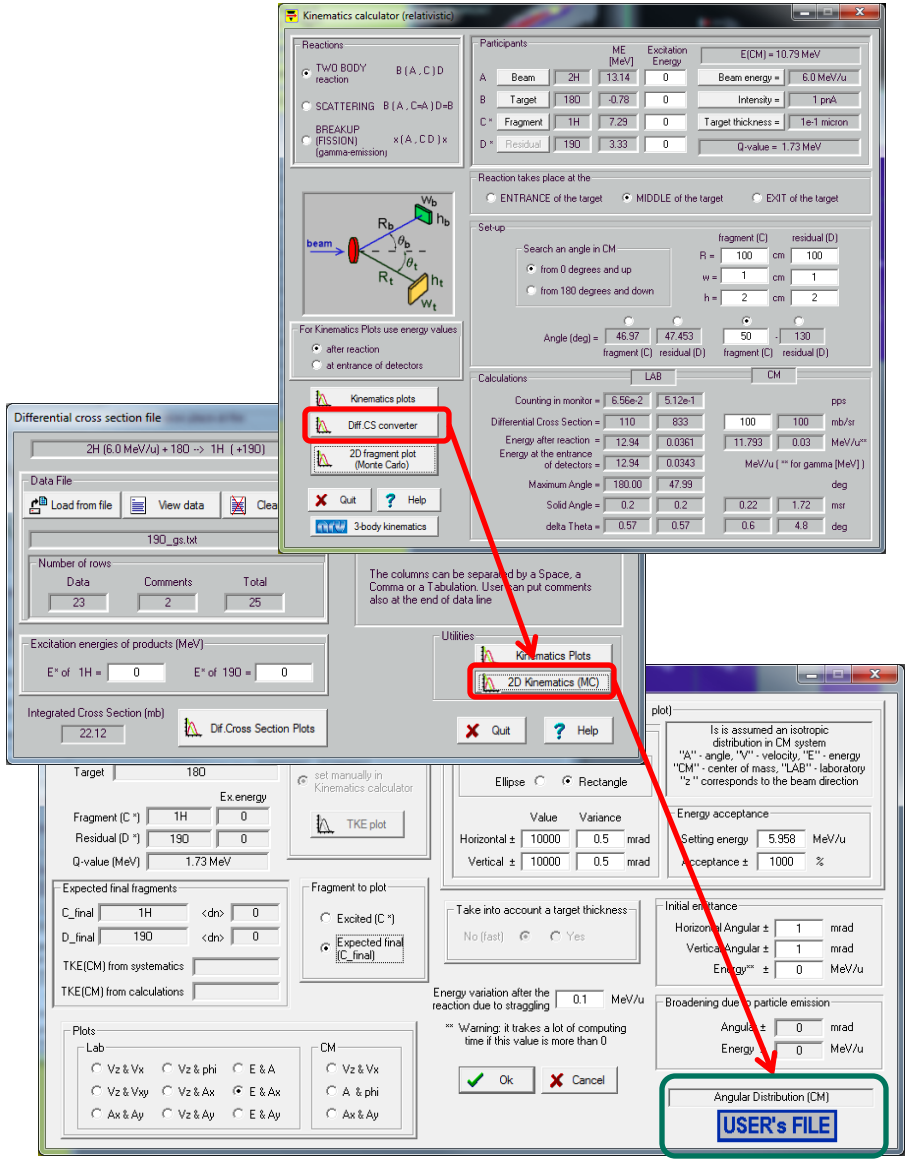
5. UserDiffCS in the MC 2d-kinematics

Isotropic

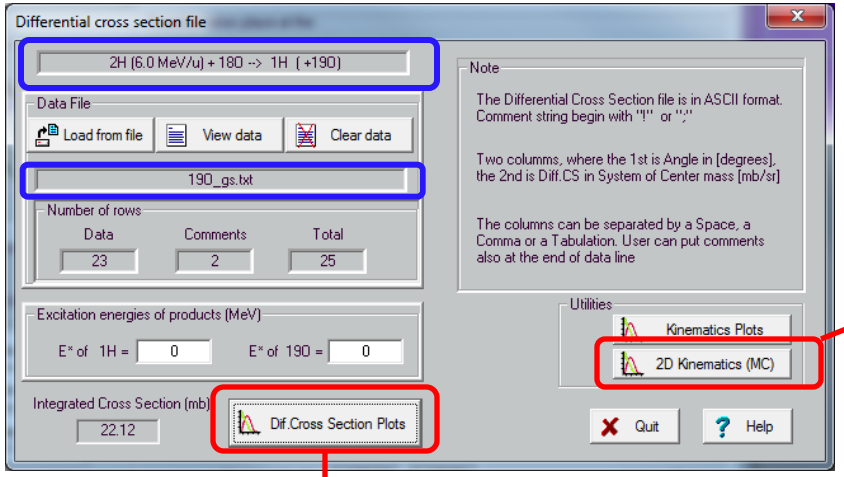


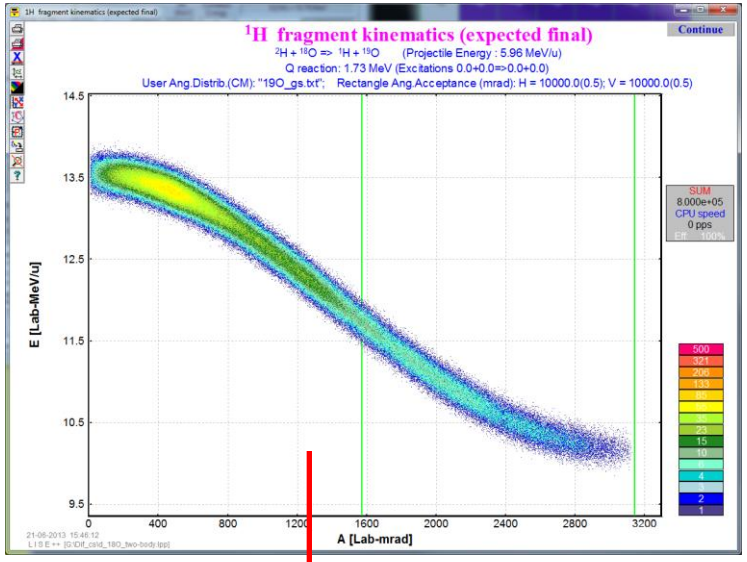


UserDiffCS

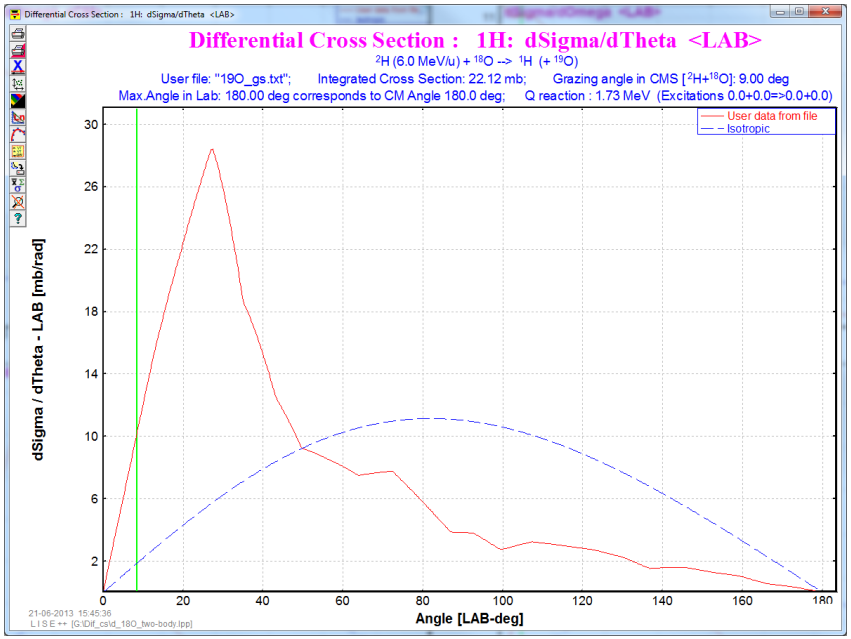


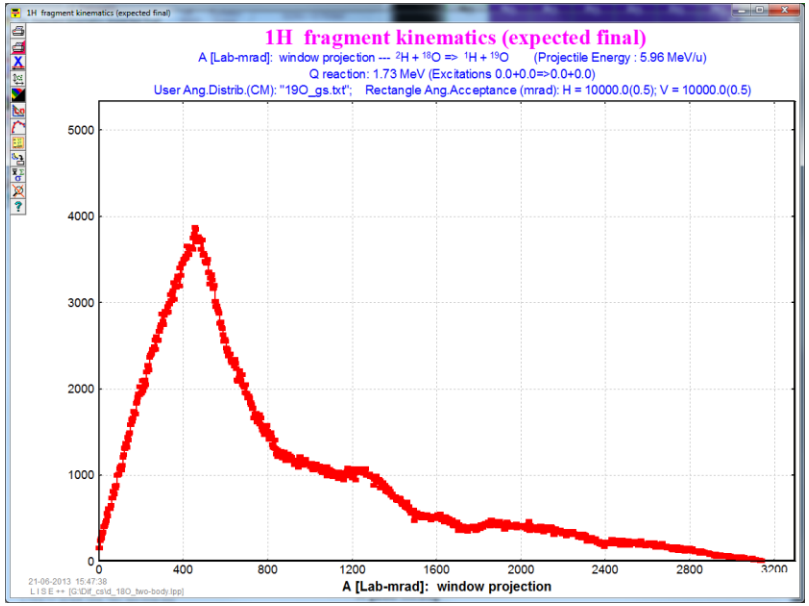
UserDiffCS in the MC 2d-kinematics : file "19O_gs.txt", E*=0



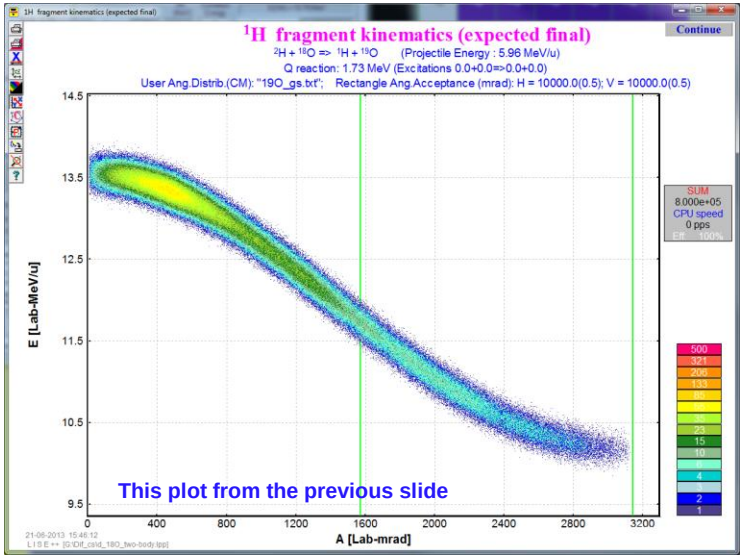


X-projection

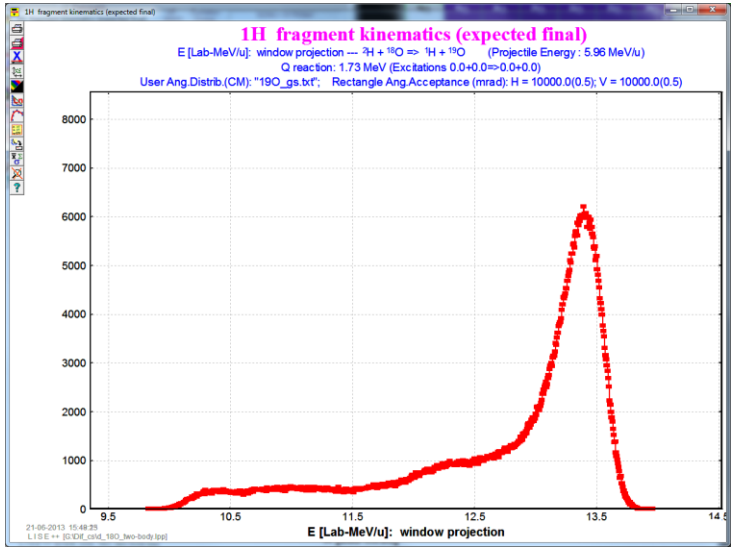


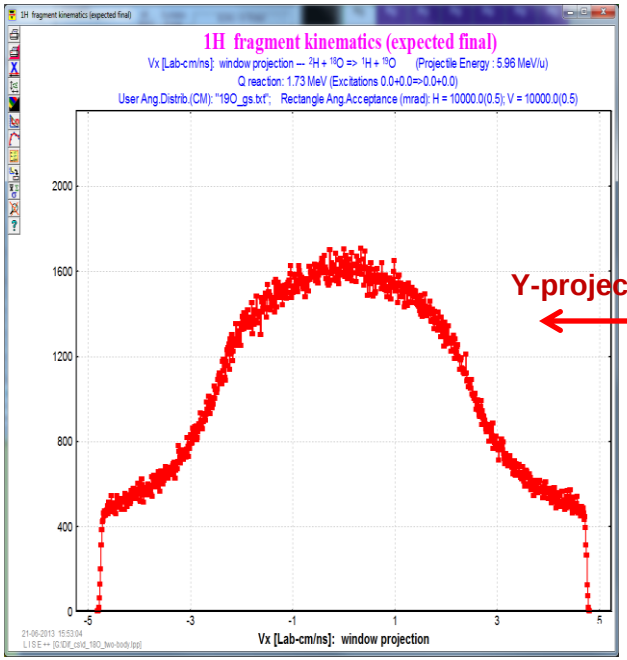


UserDiffCS in the MC 2d-kinematics : file "19O_gs.txt", E*=0

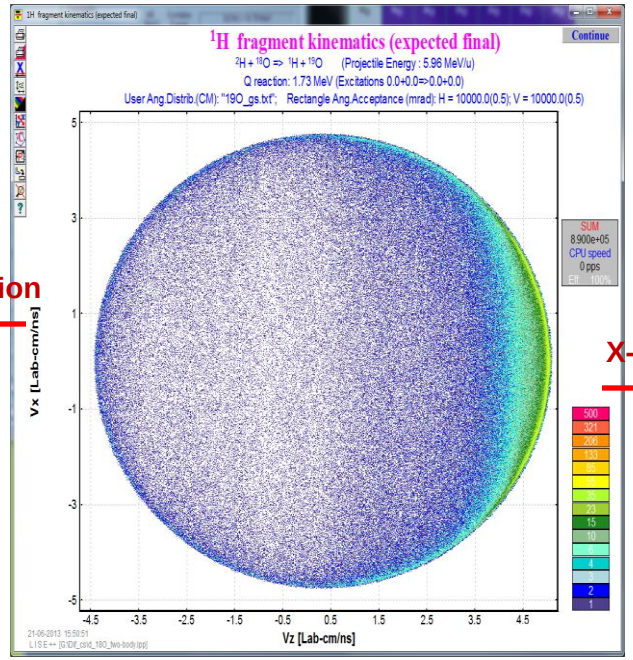


Y-projection

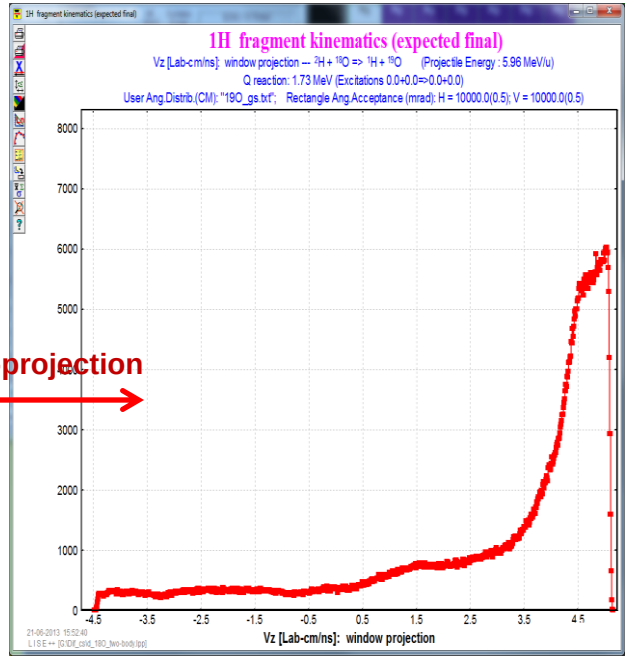




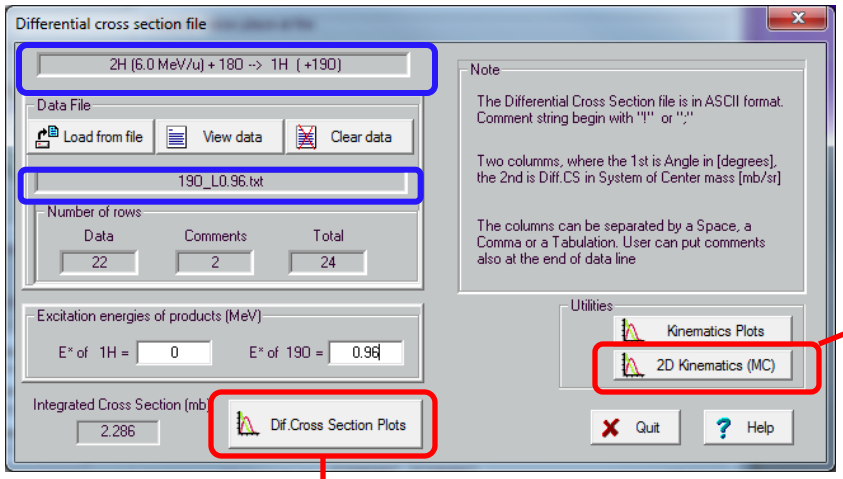
Y-projection

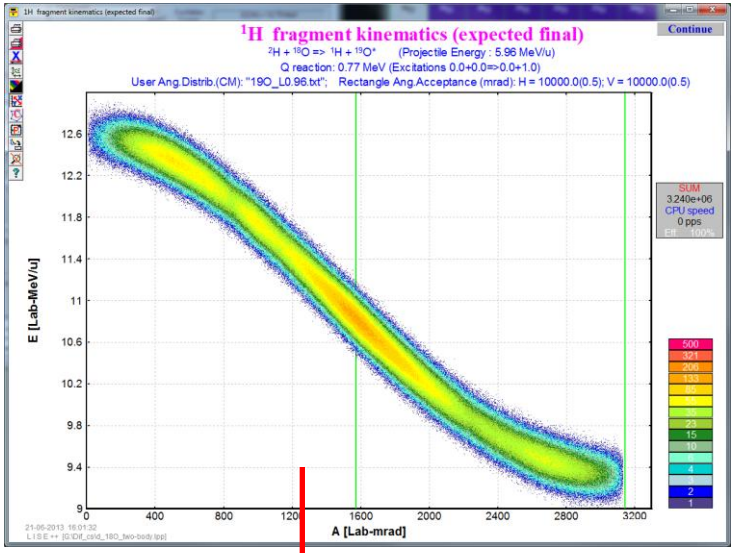


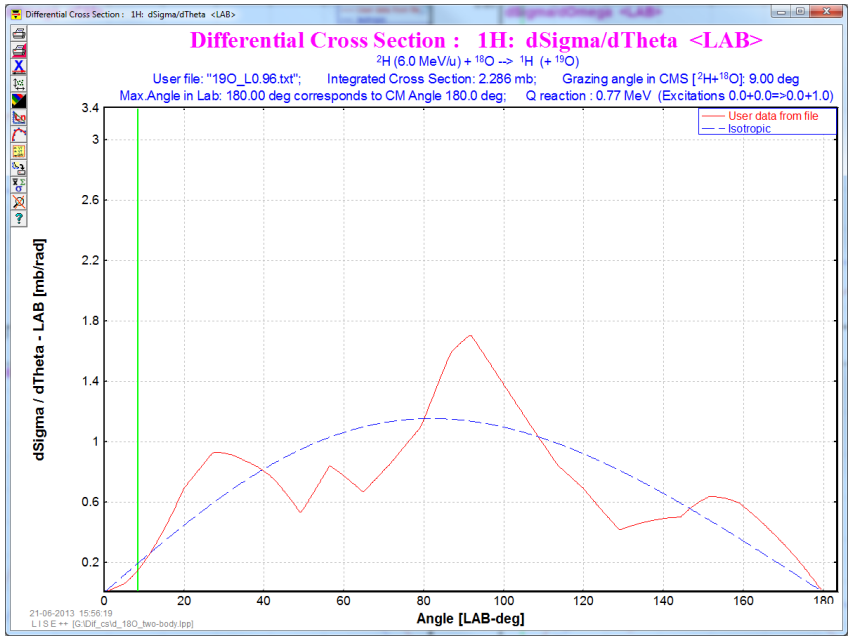
X-projection



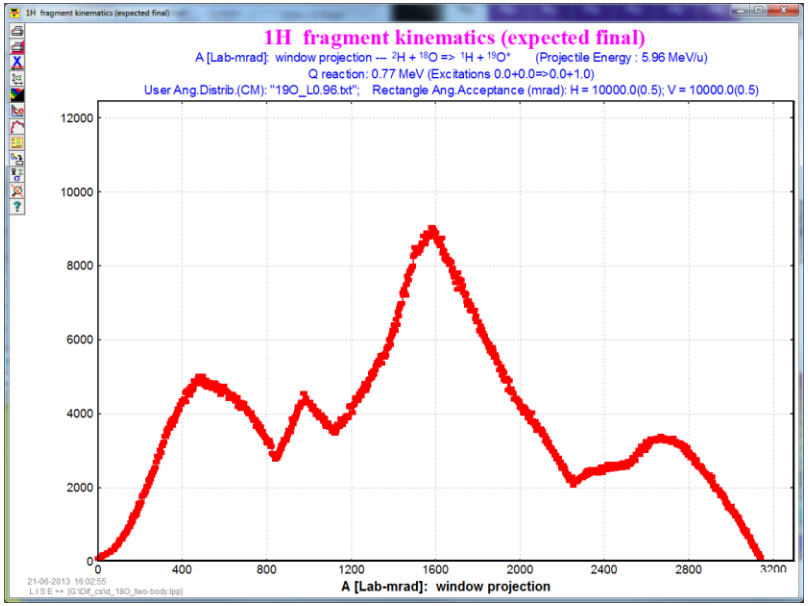
UserDiffCS in the MC 2d-kinematics : file "19O_L0.96.txt", E*=0.96



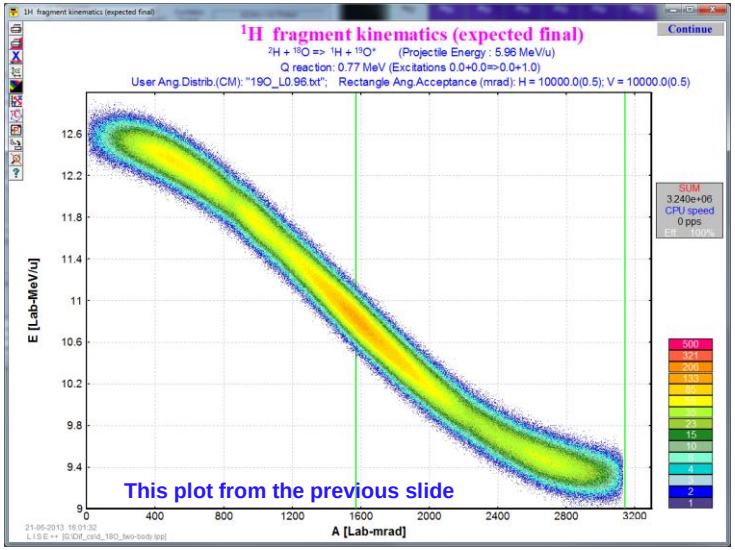




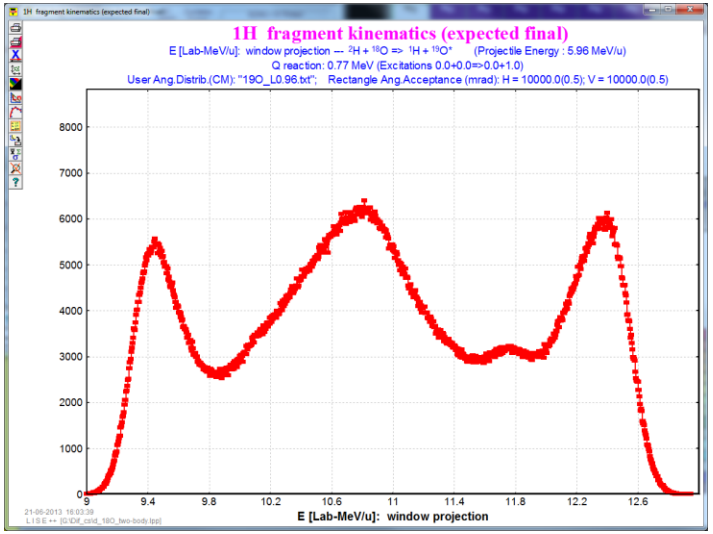
X-projection

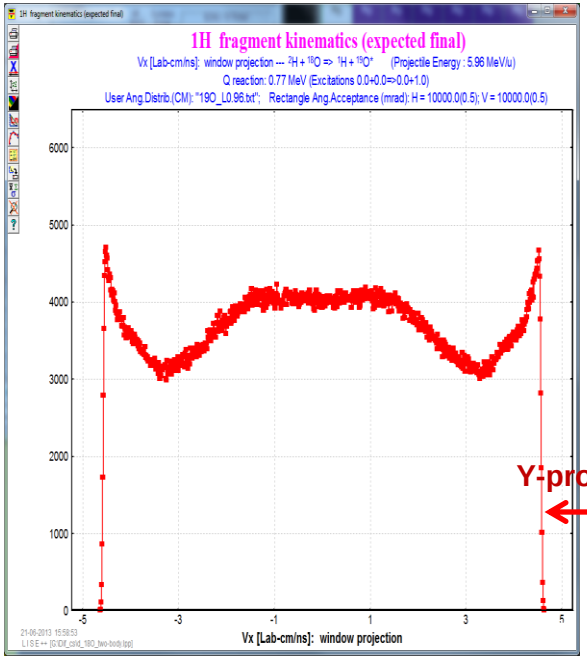


UserDiffCS in the MC 2d-kinematics : file "19O_L0.96.txt", E*=0.96

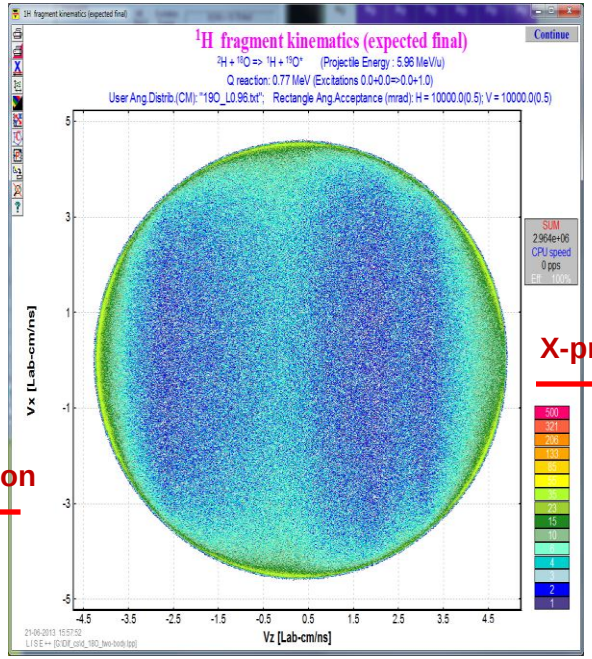


Y-projection

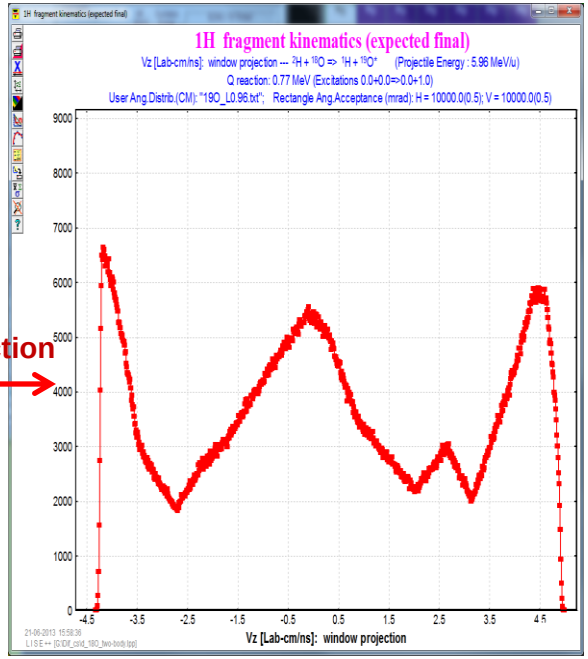




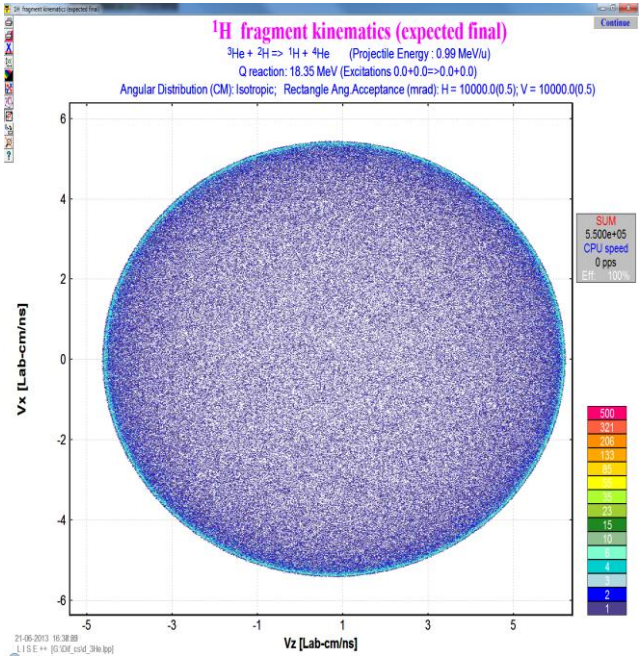
Y-projection



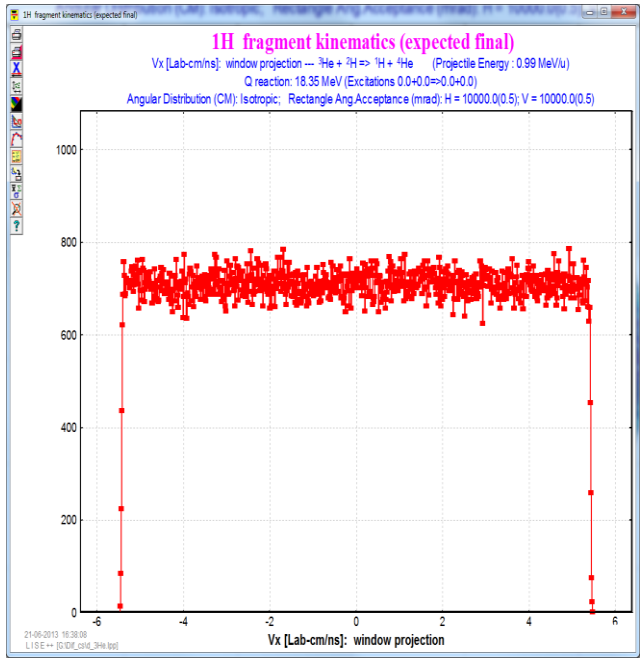
X-projection

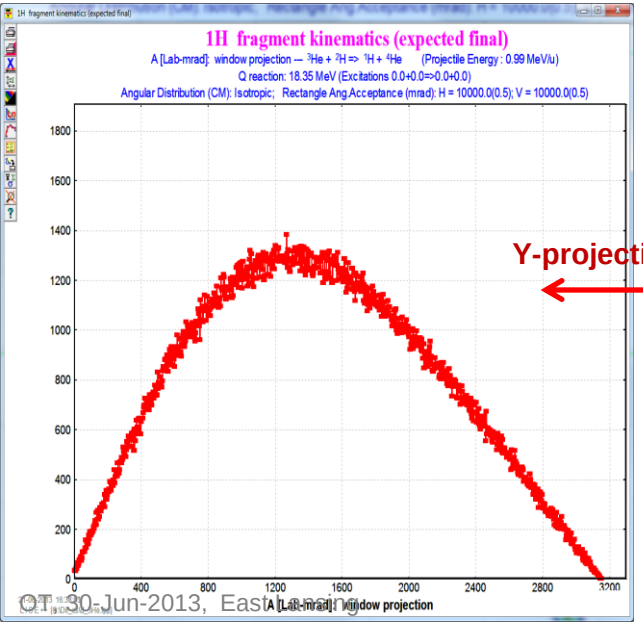


MC kinematics for LISE++ file "d_3He.lpp", Isotropic

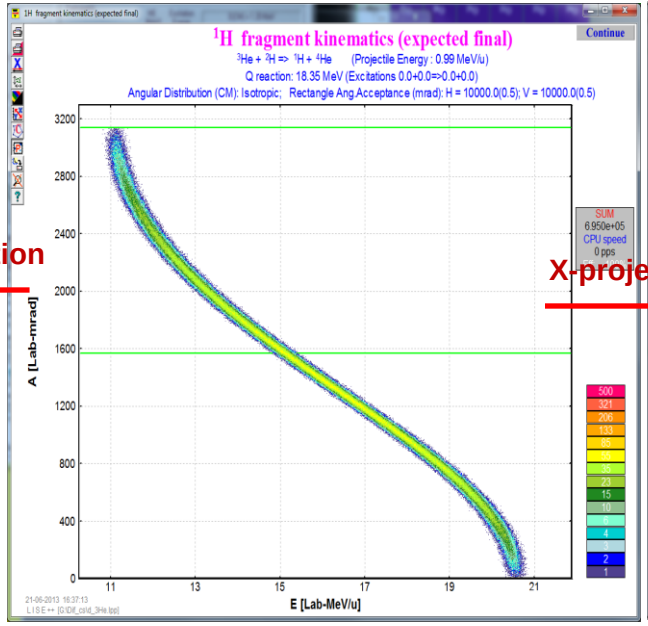


Y-projection

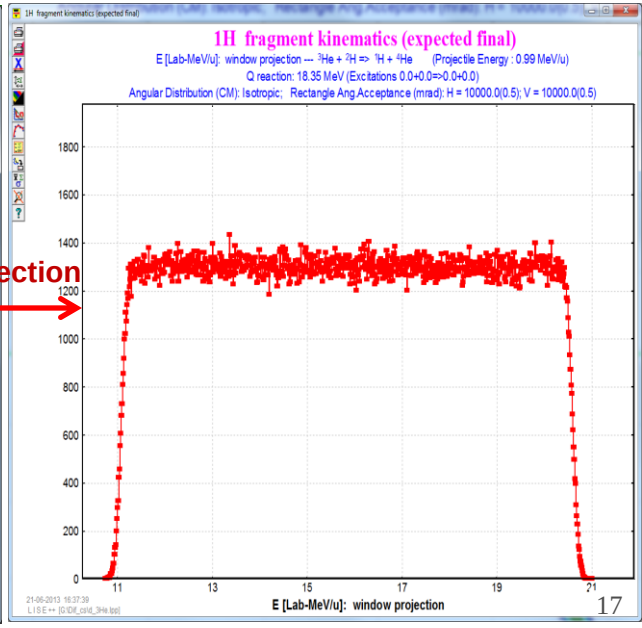




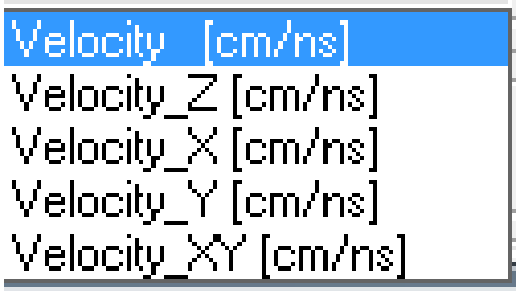
Y-projection

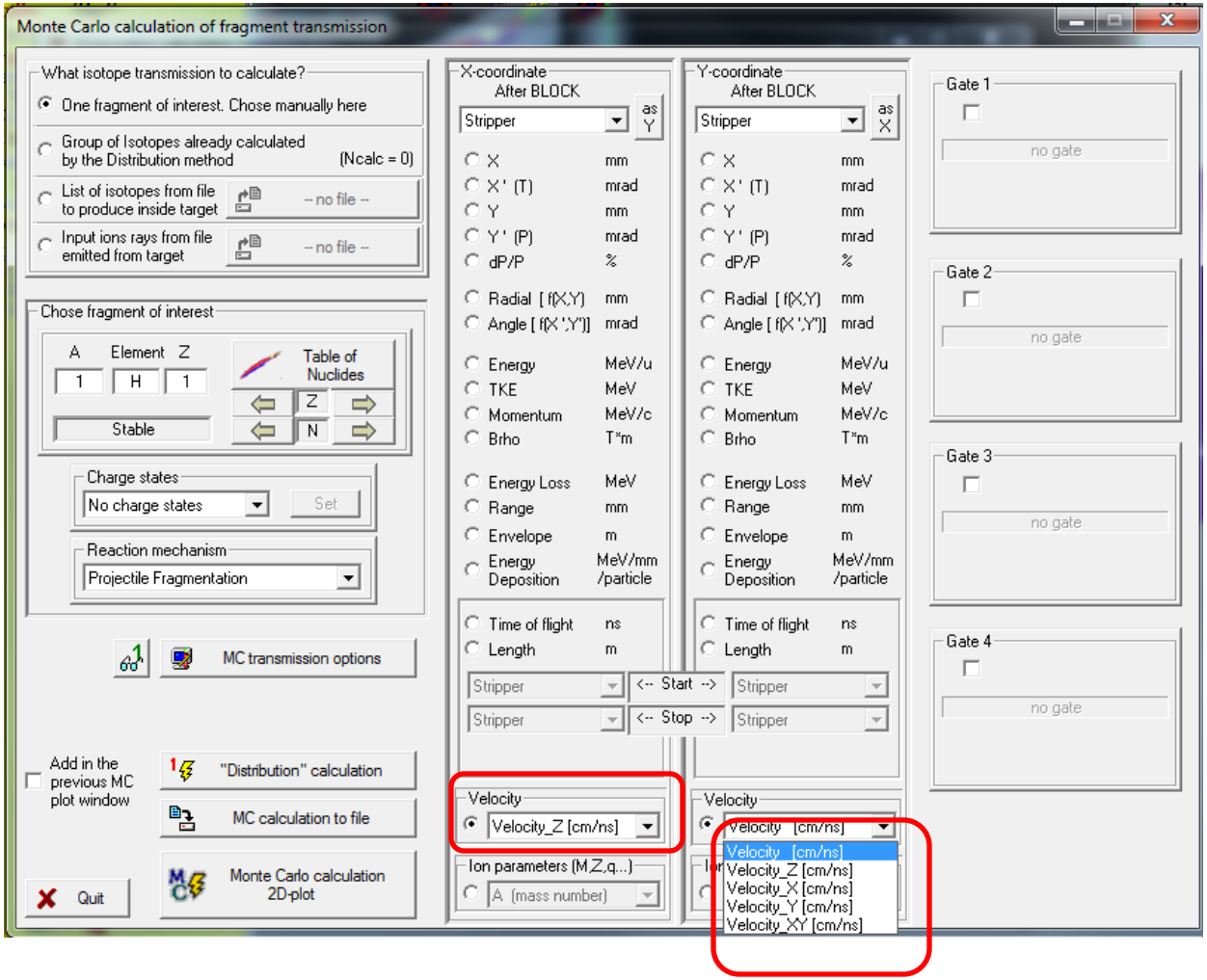


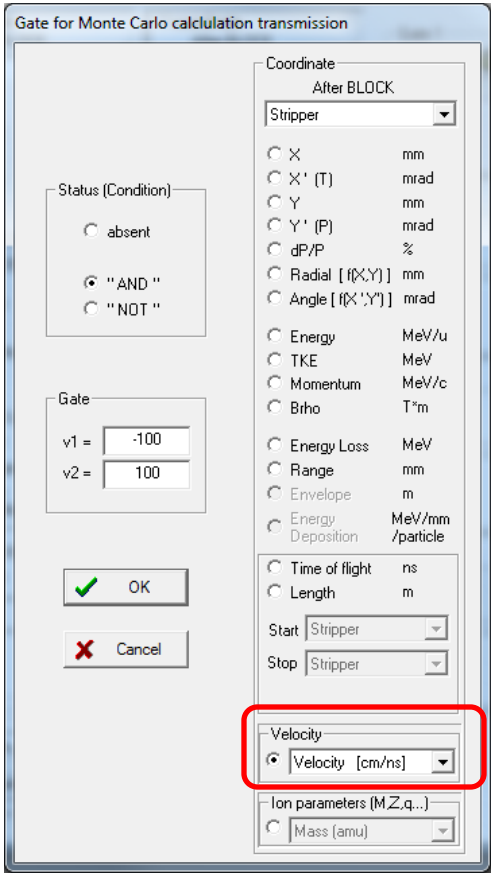
X-projection



6. New parameters the MC transmission dialog



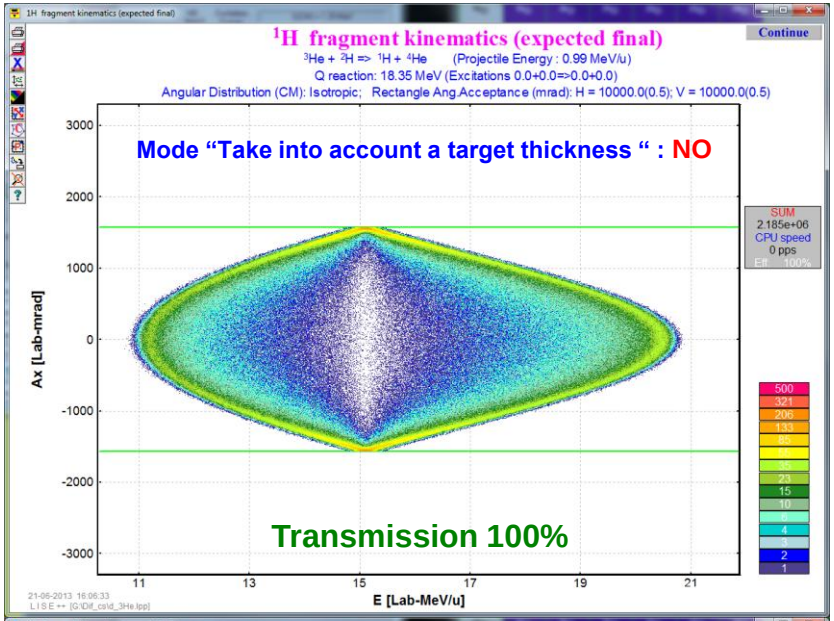


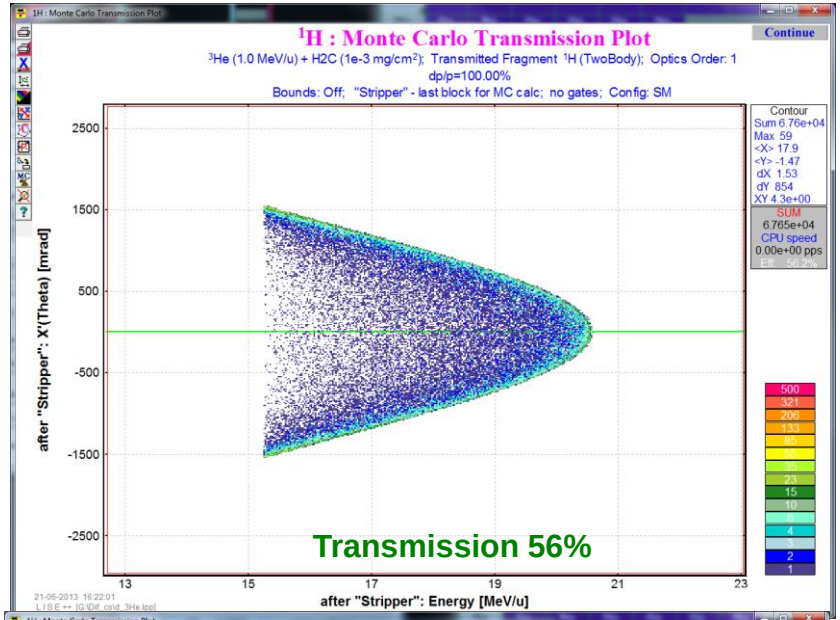


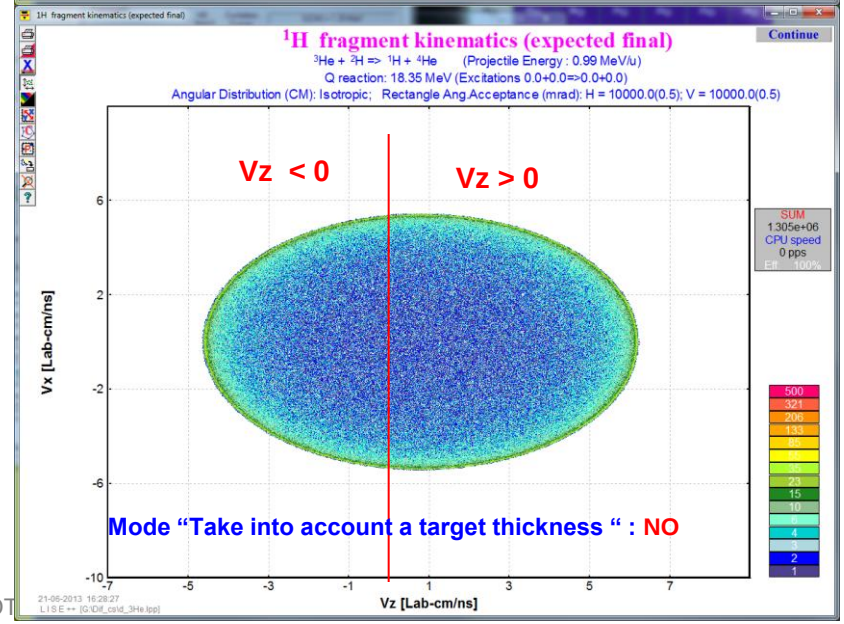
MC Kinematics

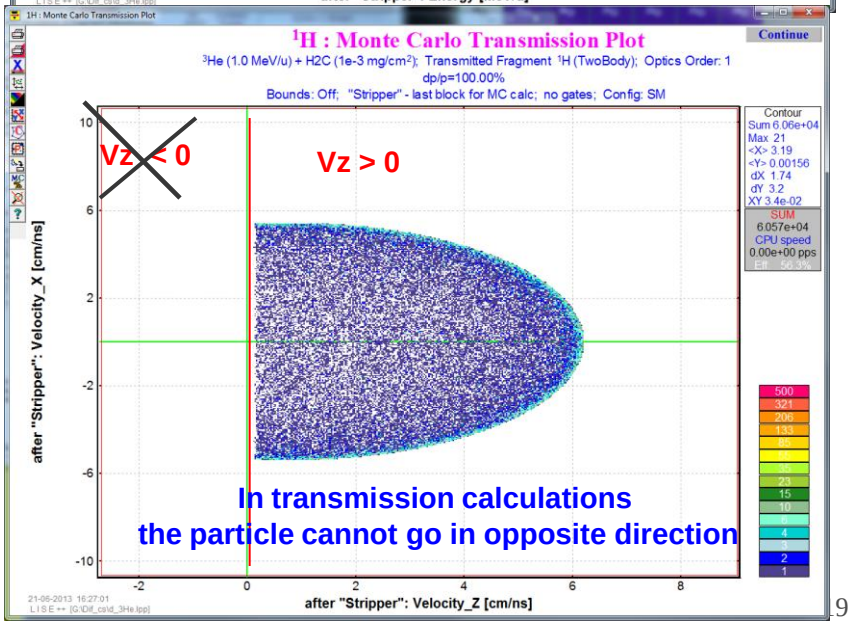
Very thin target, two-body reaction

MC Transmission





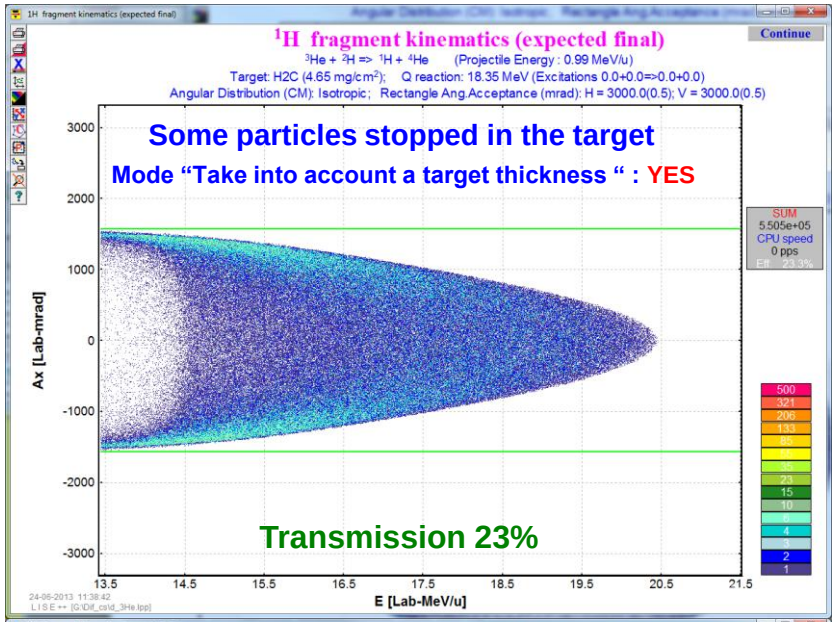


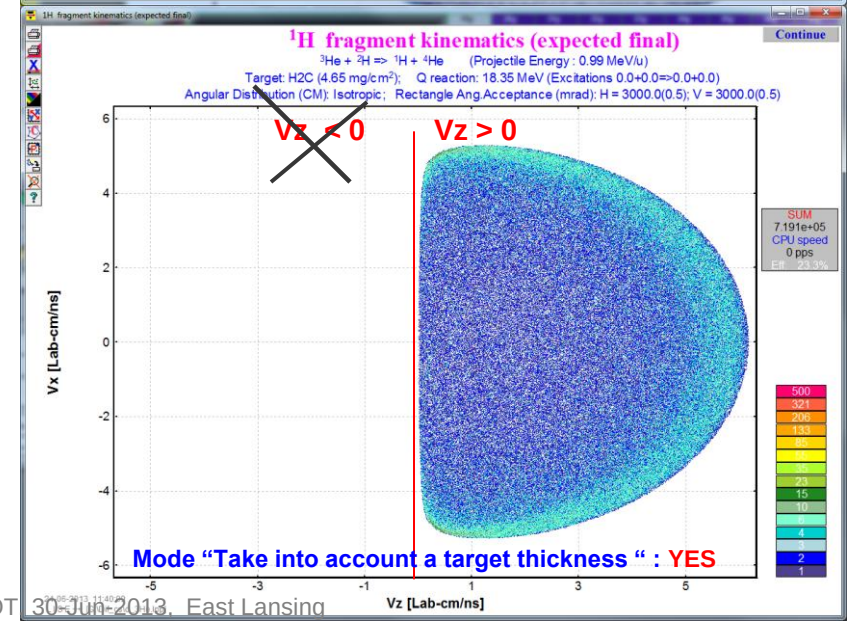


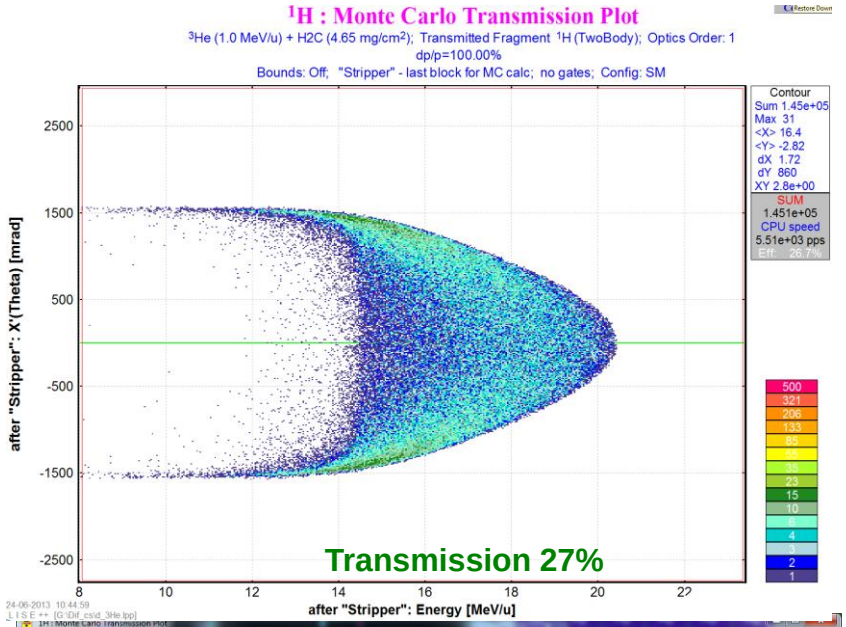
MC Kinematics

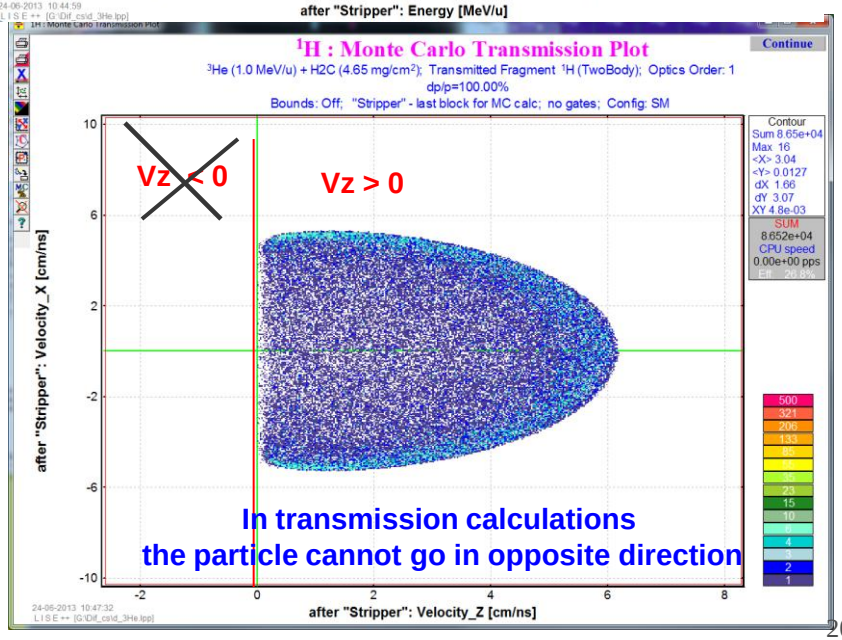
4.65 mg/cm^2 target, two-body reaction

MC Transmission

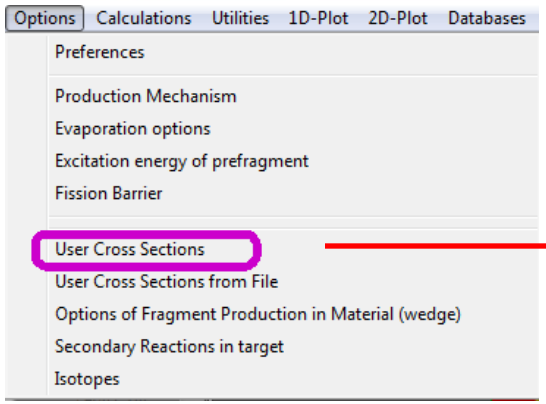


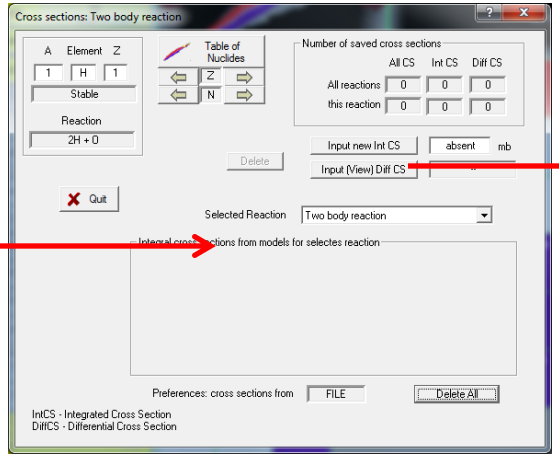


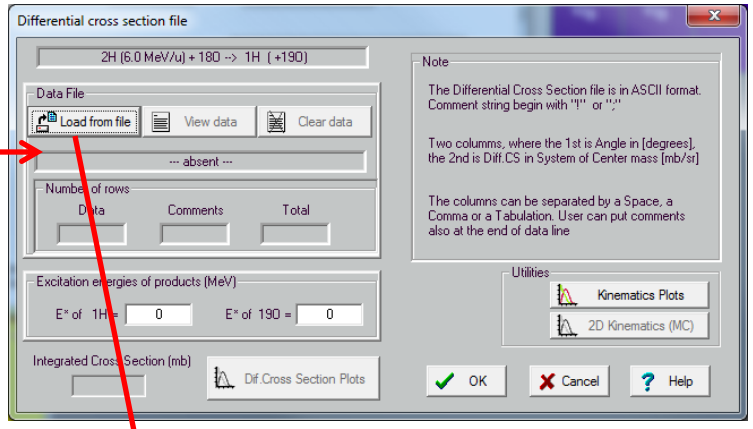


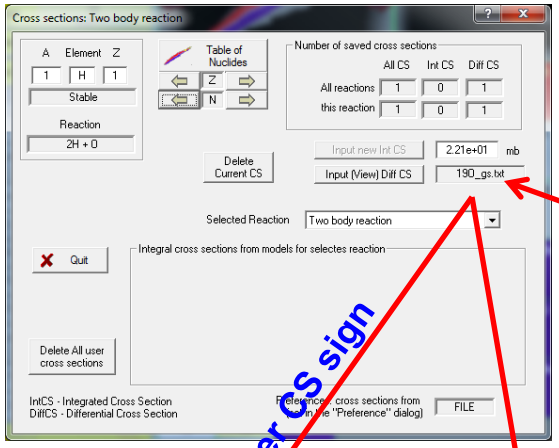


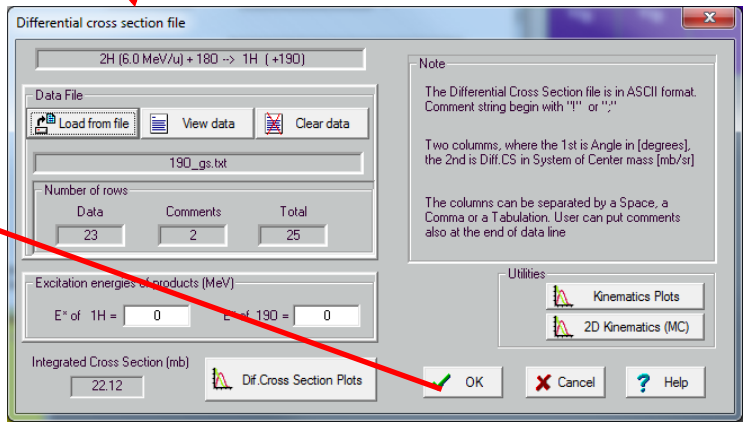
8. Loading UserDiffCS in LISE++



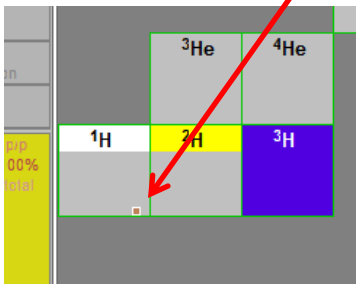


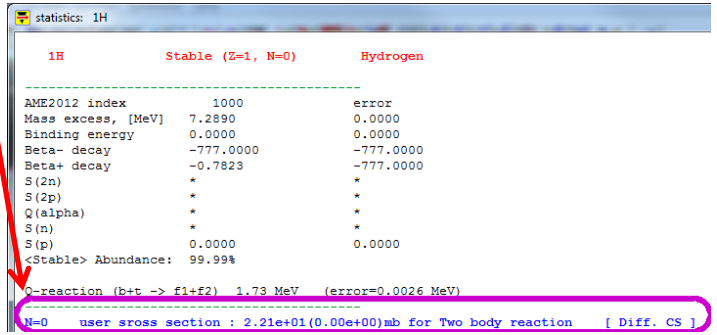




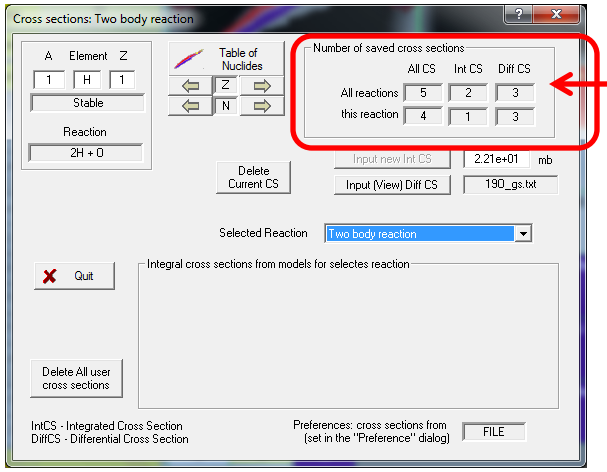


User CS sign





8a. UserDiffCS in LISE++ files (save and restore)



Information about User CSs

User CSs are saved to LISE++ files and retrieved at reading of LISE++ files

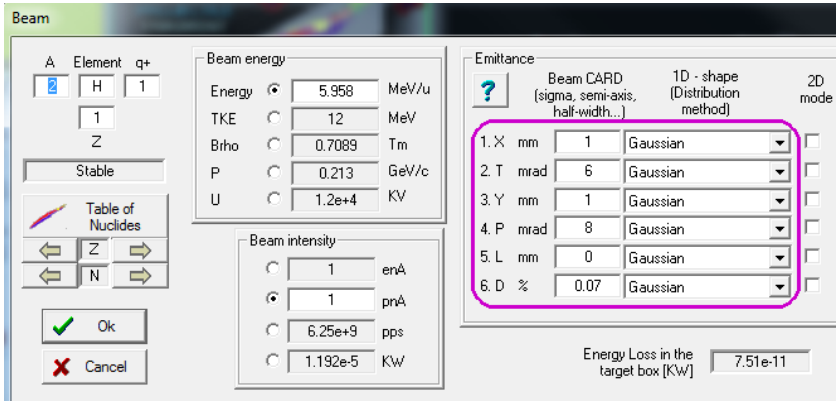
LISE++ file

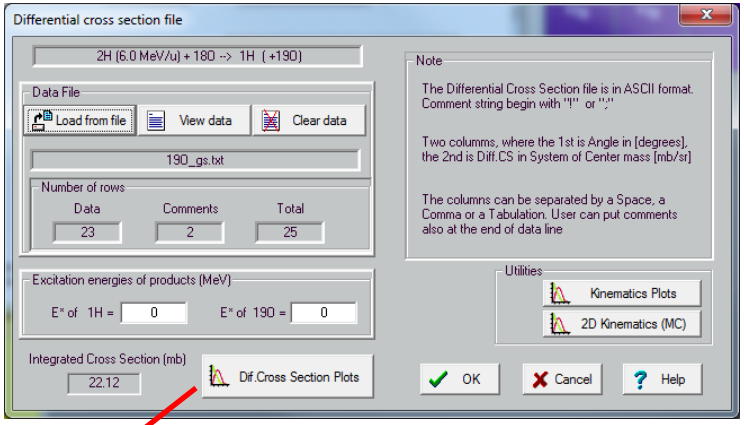
```
[cs_file]
          UserDiffCS = 3                                  ; Number of User Diff CS saved in this file
       AppendOverwrite = 1
        AttachedInside = 1
```

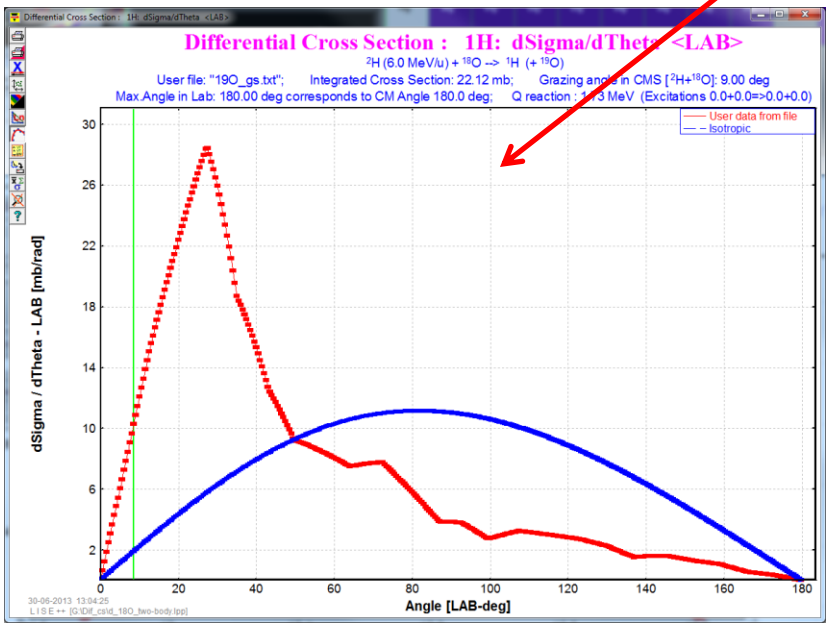
```
180     0.2

[DiffCS0002]
CorrelatedTo=3
Filename=190_L0.96.txt
Comment= J.Wiza et al., PhysRev 143 (1966) 676 -- Level 0.96  180(p,d)190"
Ex12 = 0.000 0.960
NofPoints  = 24
0       0.0857232
5.2971  0.0913
13.246  0.1935
21.196  0.2818
29.156  0.2849
37.123  0.2183
45.09   0.1611
52.299  0.1007
59.875  0.1487
68.598  0.11
75.418  0.1364
83.374  0.1735
90.946  0.2525
95.871  0.2742
```

Initial conditions



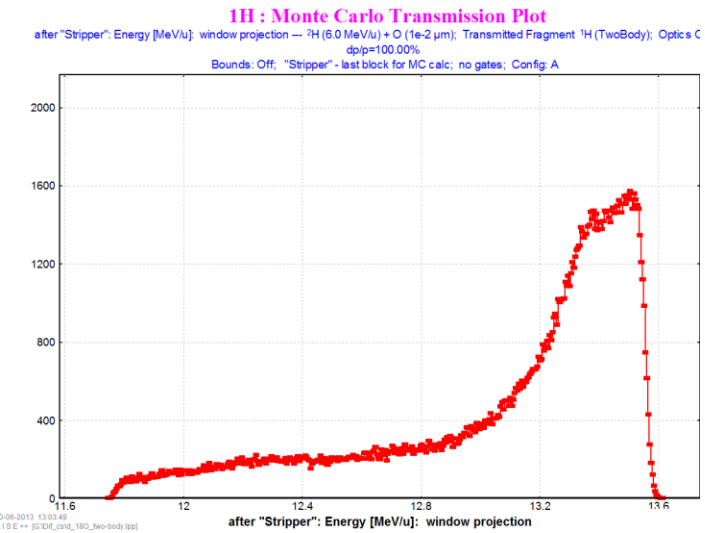




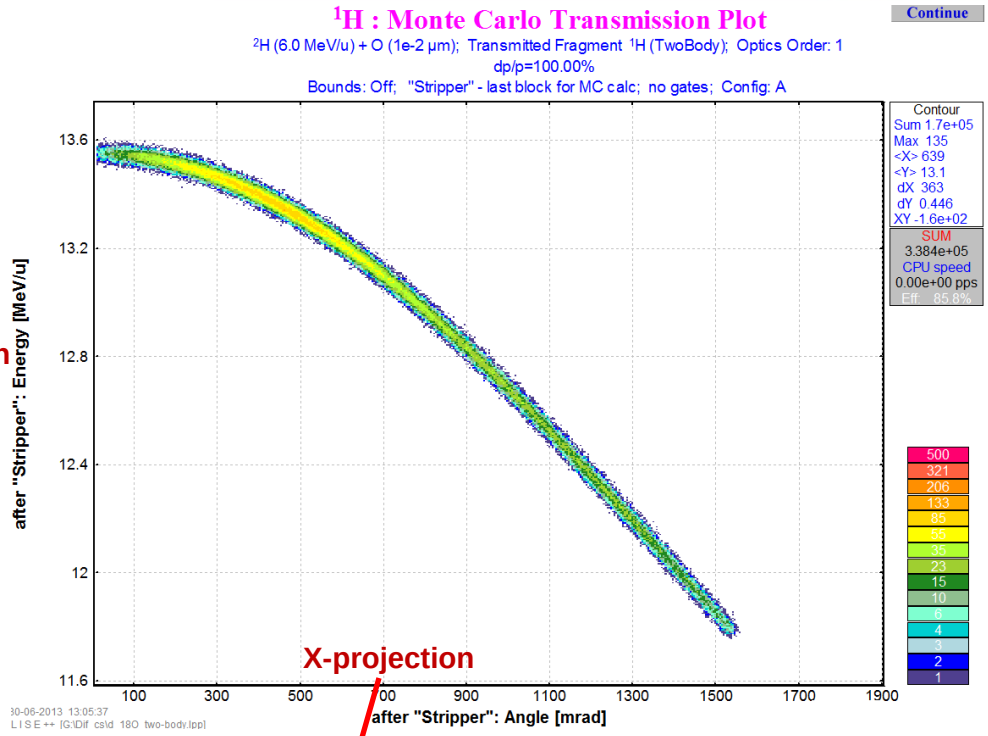
See the next slide for MC calculations

9. UserDiffCS in MC Transmission

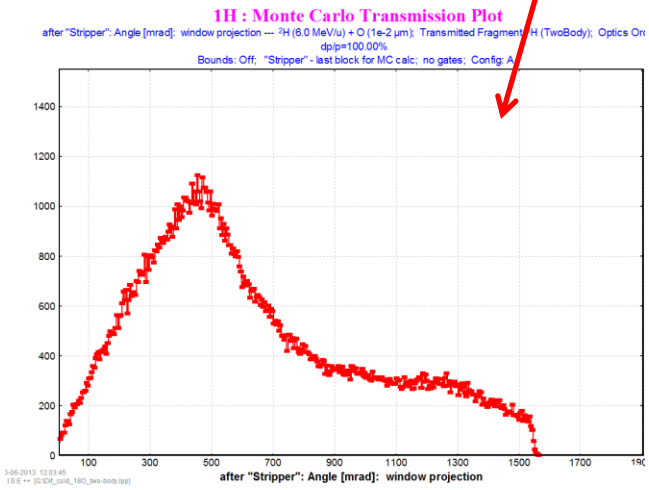
LISE++ File d_3He.lpp
DiffCS File 19O_gs.txt



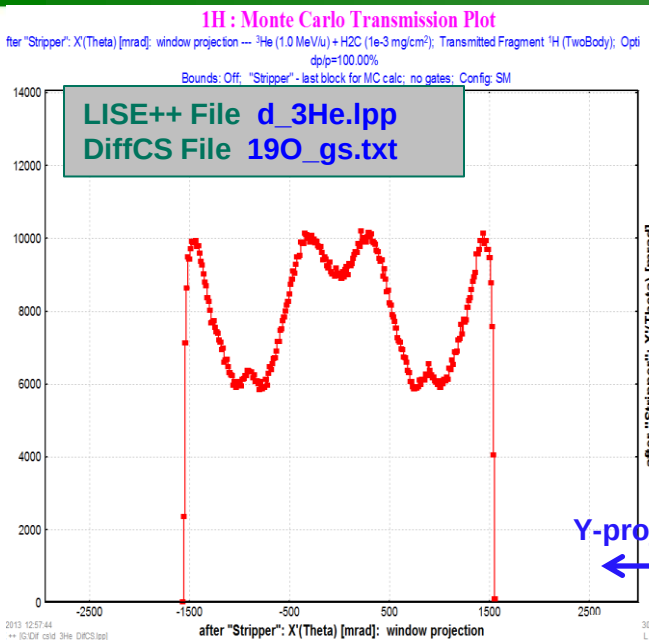
Y-projection

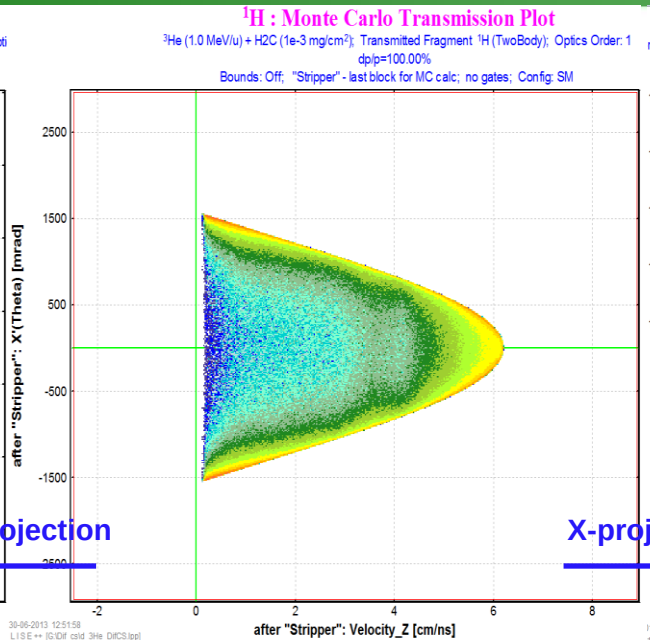


X-projection



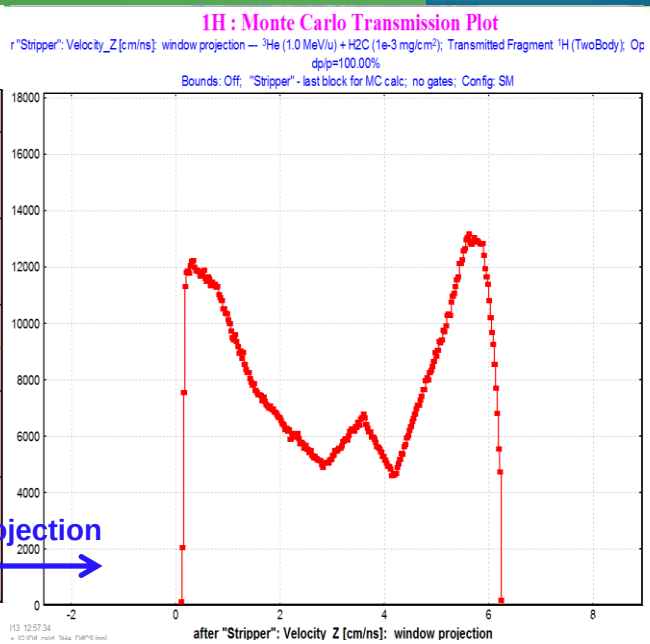
9. UserDiffCS in MC Transmission

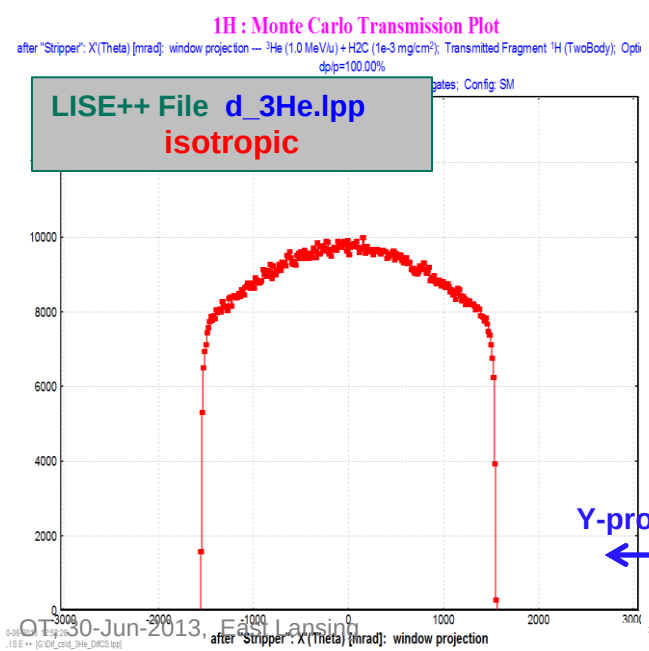


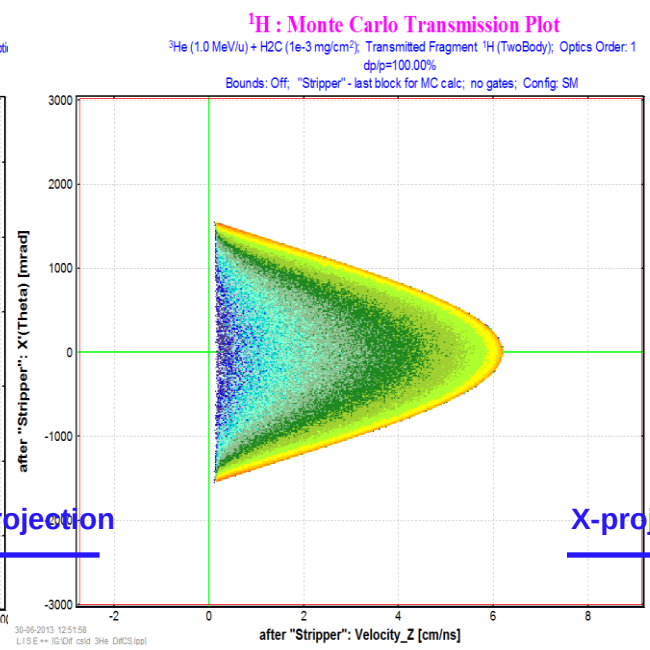


Y-projection

X-projection

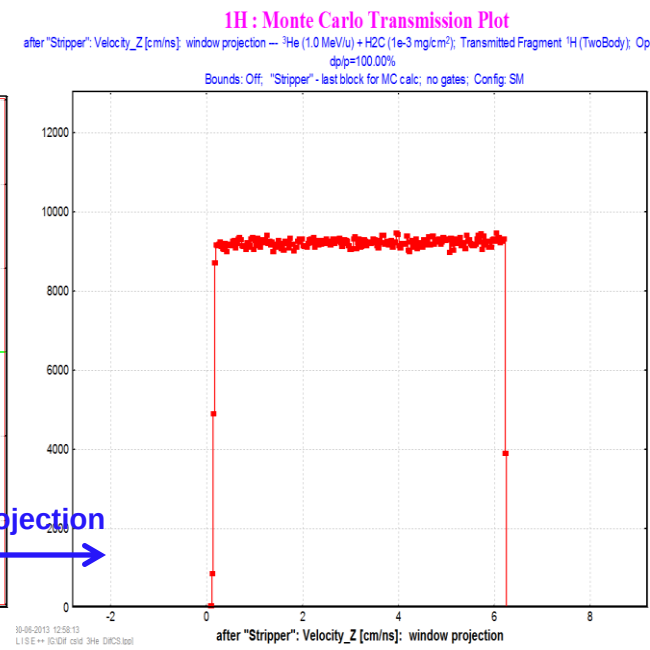






Y-projection

X-projection



10. Next steps in UserDiffCS development

- ~~Input UserDiffCS files in LISE++ for future transmission calculations~~
  (done version 9.6.54)

- ~~Keep UserDiffCS in LISE++ files (save and restore)~~
  (done version 9.6.54)

- ~~Use UserDiffCS in MC transmission calculations for two-body reactions~~
  (done version 9.6.54)

- Improve analytical transmission calculations for two-body reactions

- Use UserDiffCS in Analytical transmission calculations for two-body reactions