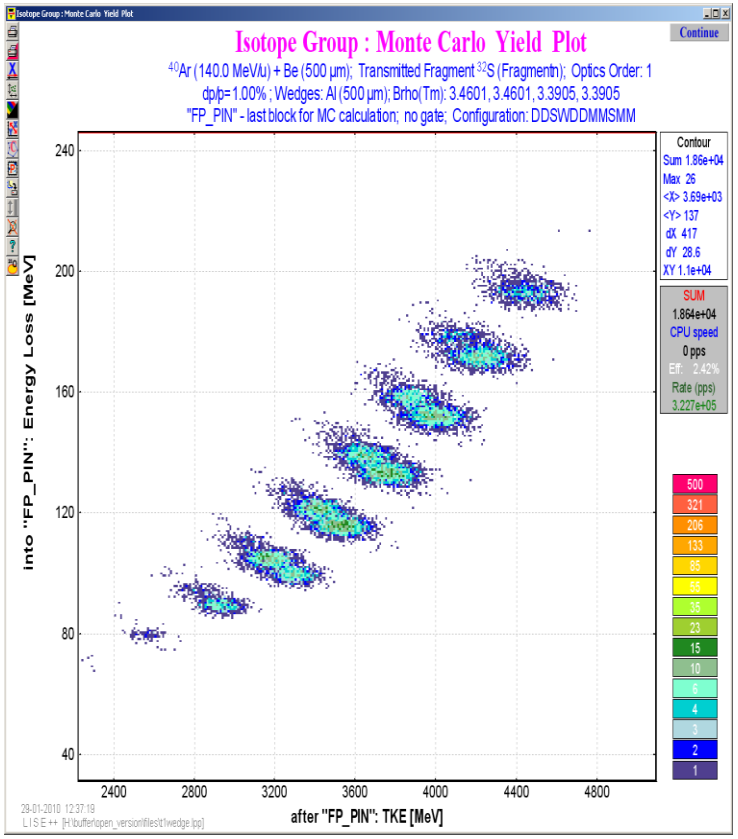
# Monte Carlo : Isotope group calculation

The code operates under MS Windows environment and provides a highly user-friendly interface.
It can be freely downloaded from the following internet addresses:
http://www.nscl.msu.edu/lise

## *version 8.5.34*

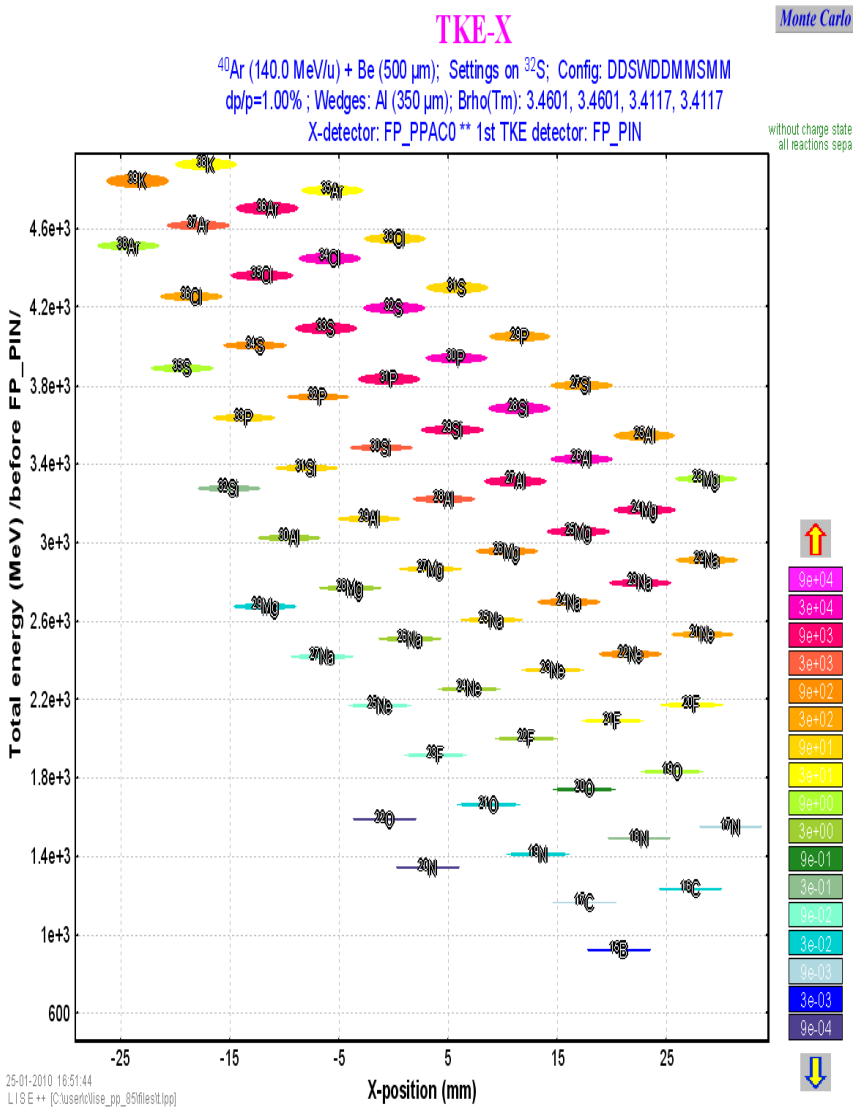
Contents:

- *LISE++ models to calculate, to plot*
- *MC dialog modifications*
- *Isotope group options*
- *"Yield" and "Transmission" modes*
- *Isotope identification for Isotope group*
- *Isotope group vs. MC writing to file*
- *Energy deposition mode : example*
- *Plans for MC development*

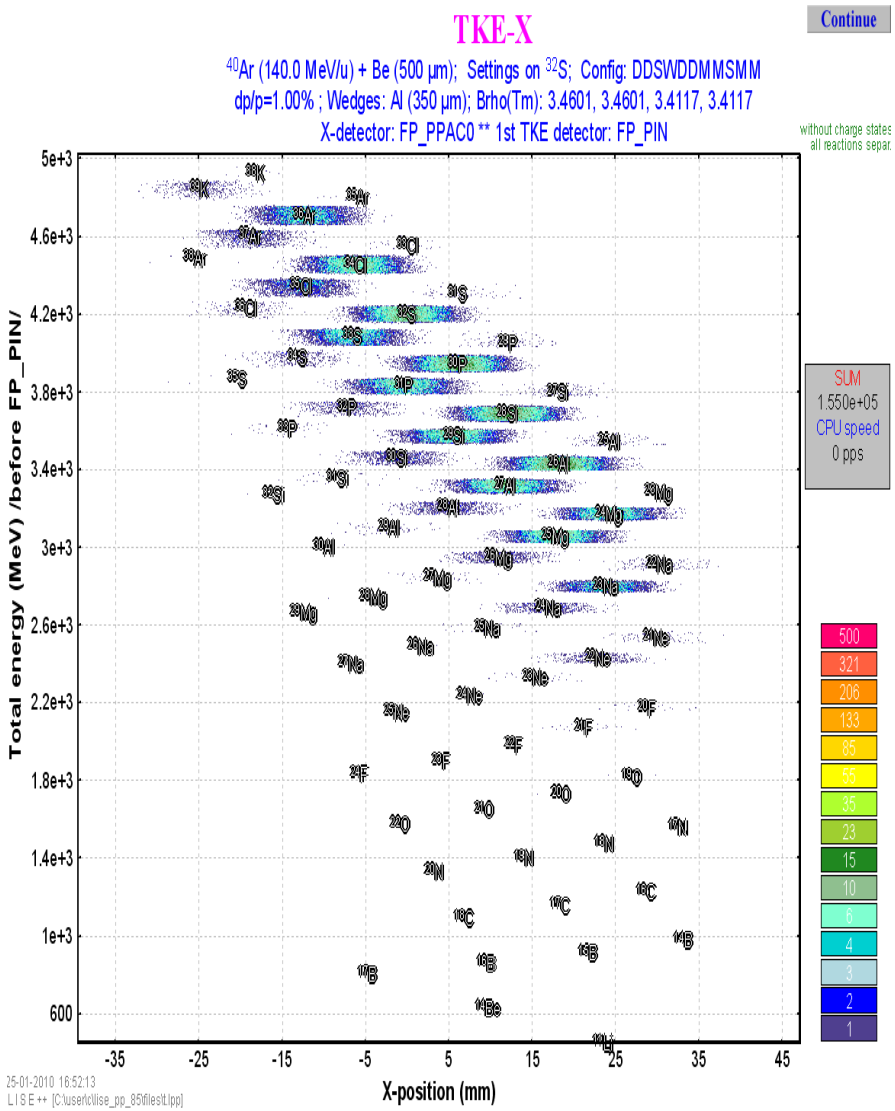


# Distribution method

## Ellipse plot



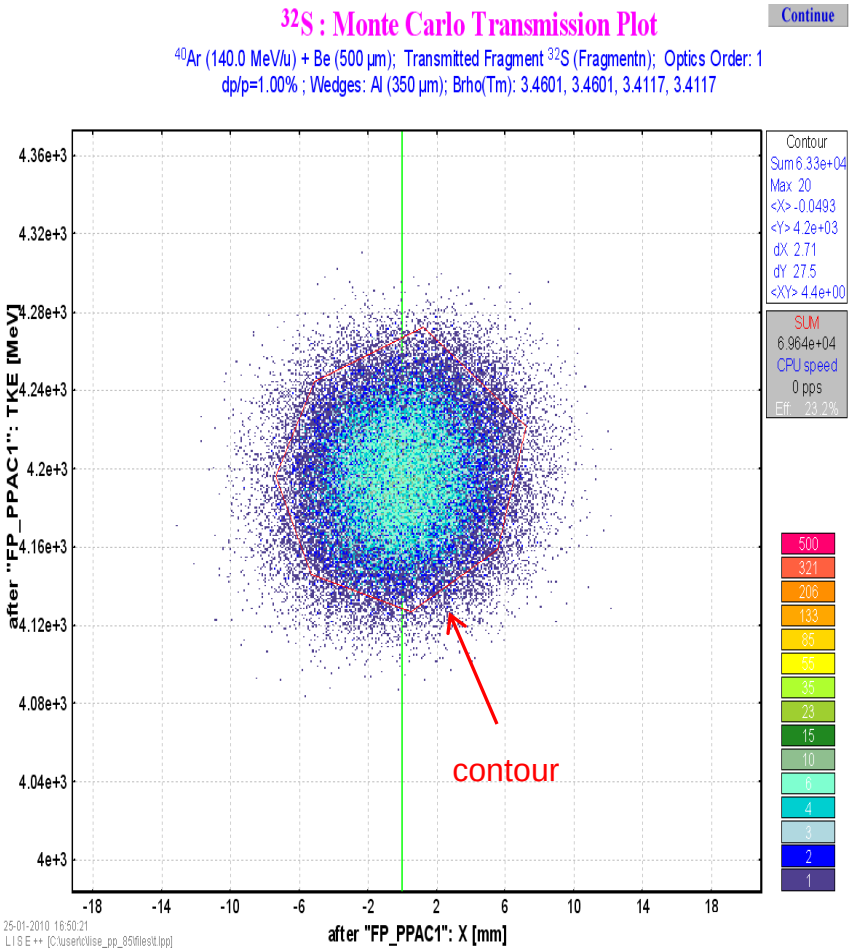

## Pseudo MC plot

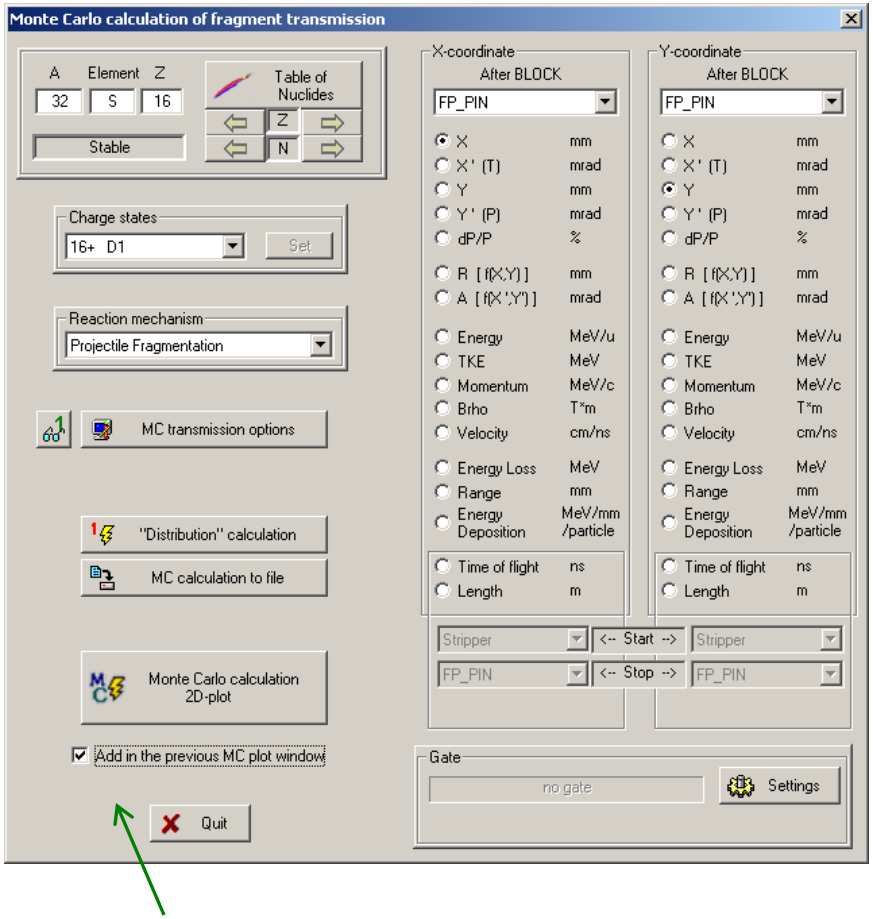


# Monte Carlo Transmission Plot

Only one isotope to simulate

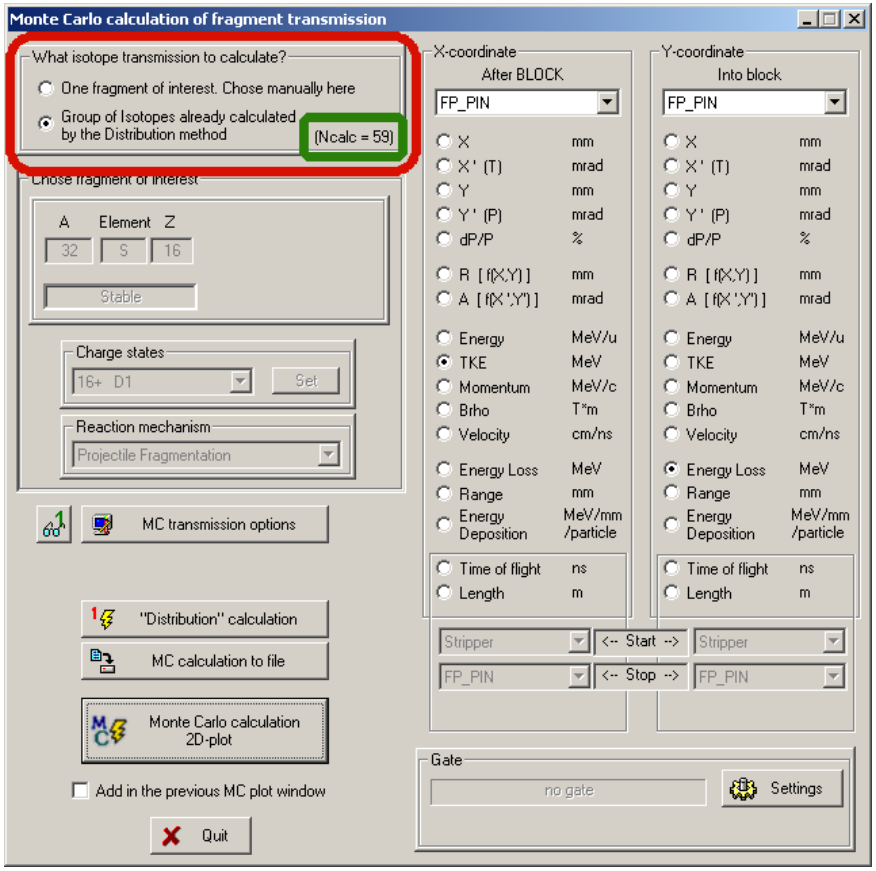
Version 8.4

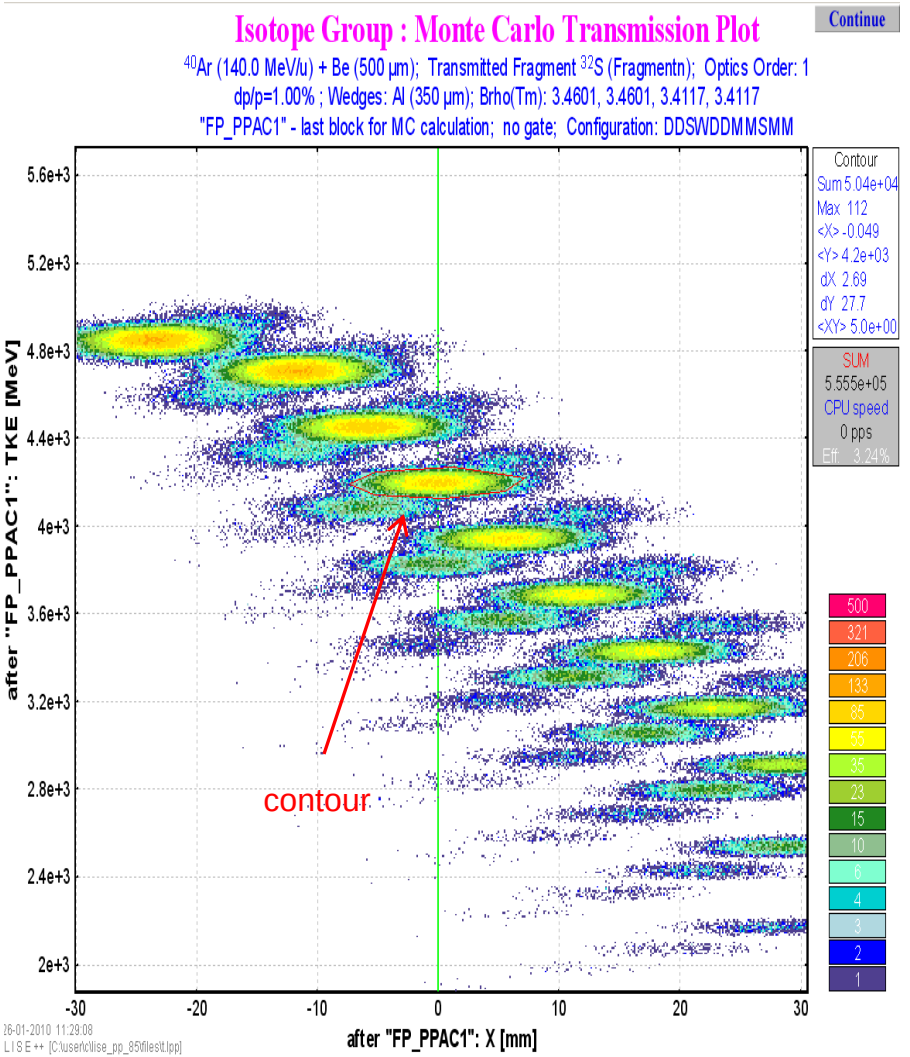



Option to add in the old plot

# Monte Carlo dialog : version 8.5.34

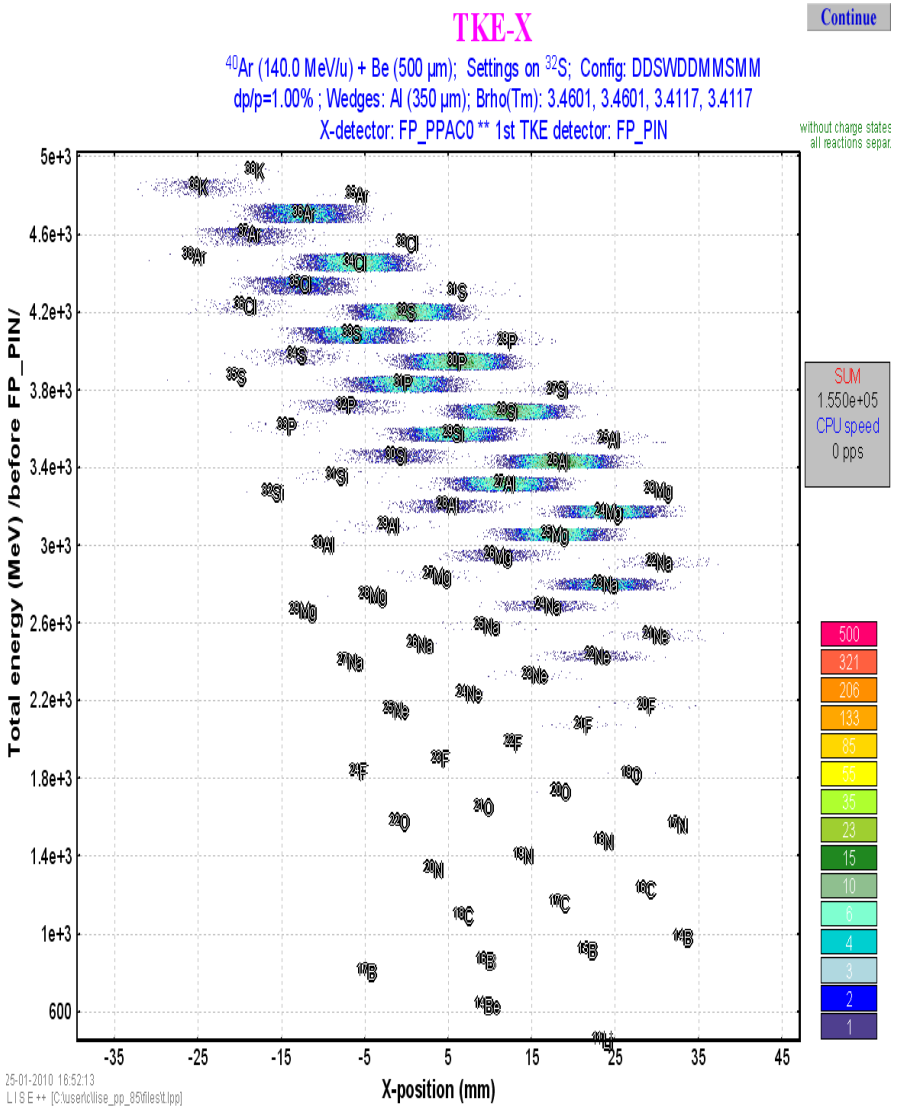


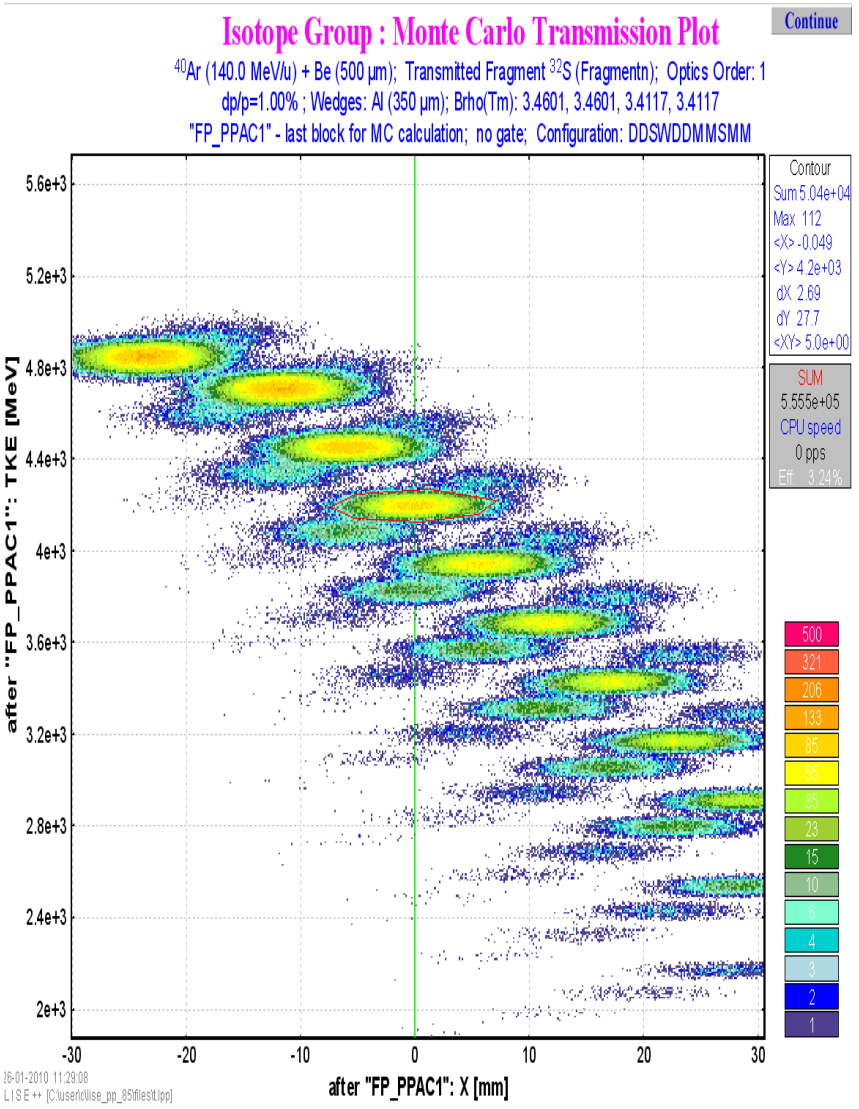

Works for all reactions (temporally except secondary targets).
Takes into account secondary reactions in target,
charge state calculations,
losses due to reactions in materials and so on

# Comparison

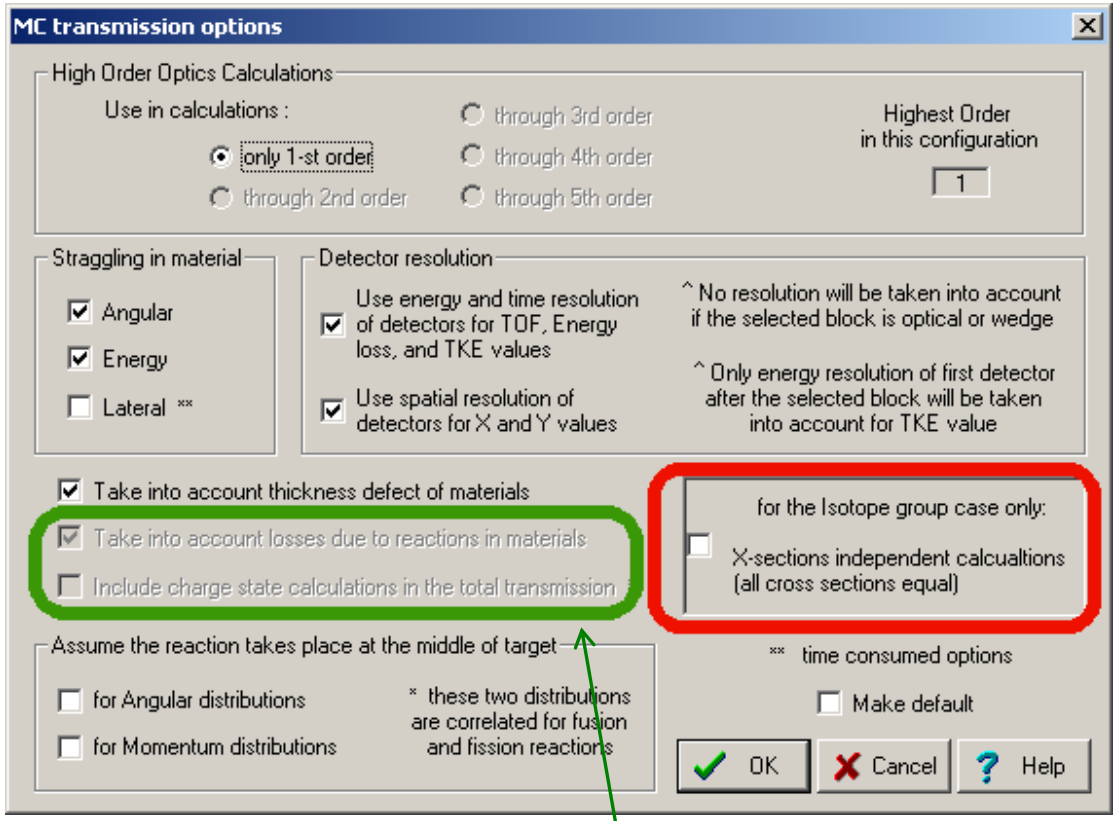
## Pseudo MC plot
## Time!




## MC transmission plot
## Quality!



# MC options for Isotope Group Calculations

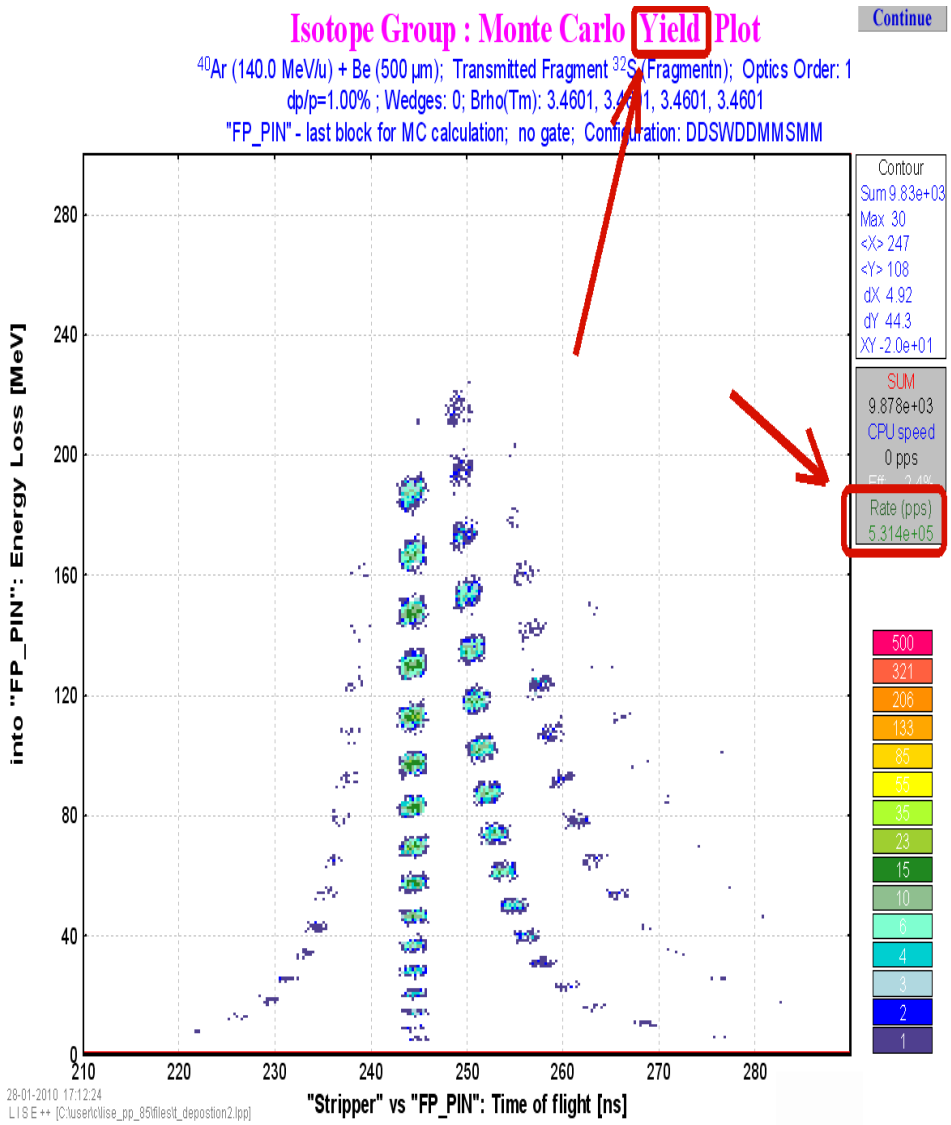


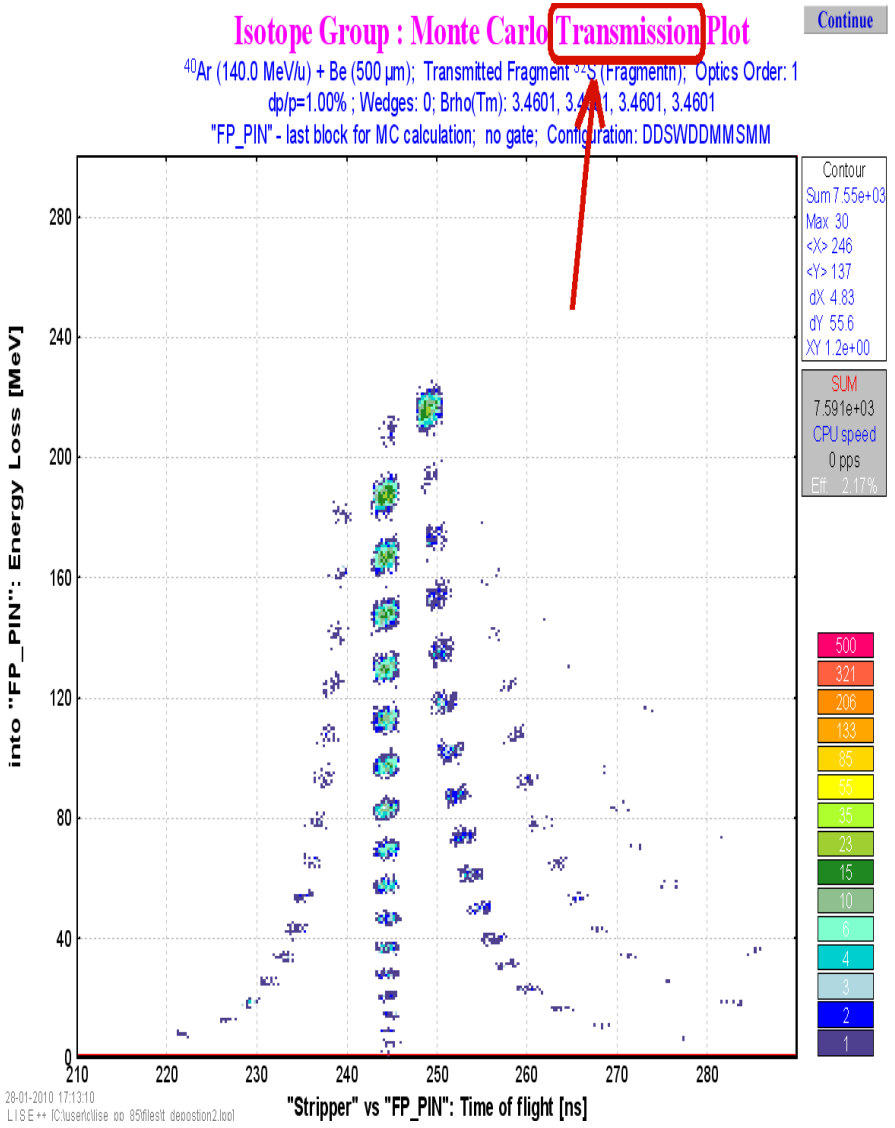

Only for Isotope group:

Switch between "Yield" and "Transmission" modes

These options are disabled to change,
And they will be set according to options
used for Distribution method calculations

# Isotope Group: “Yield” & “Transmission” modes



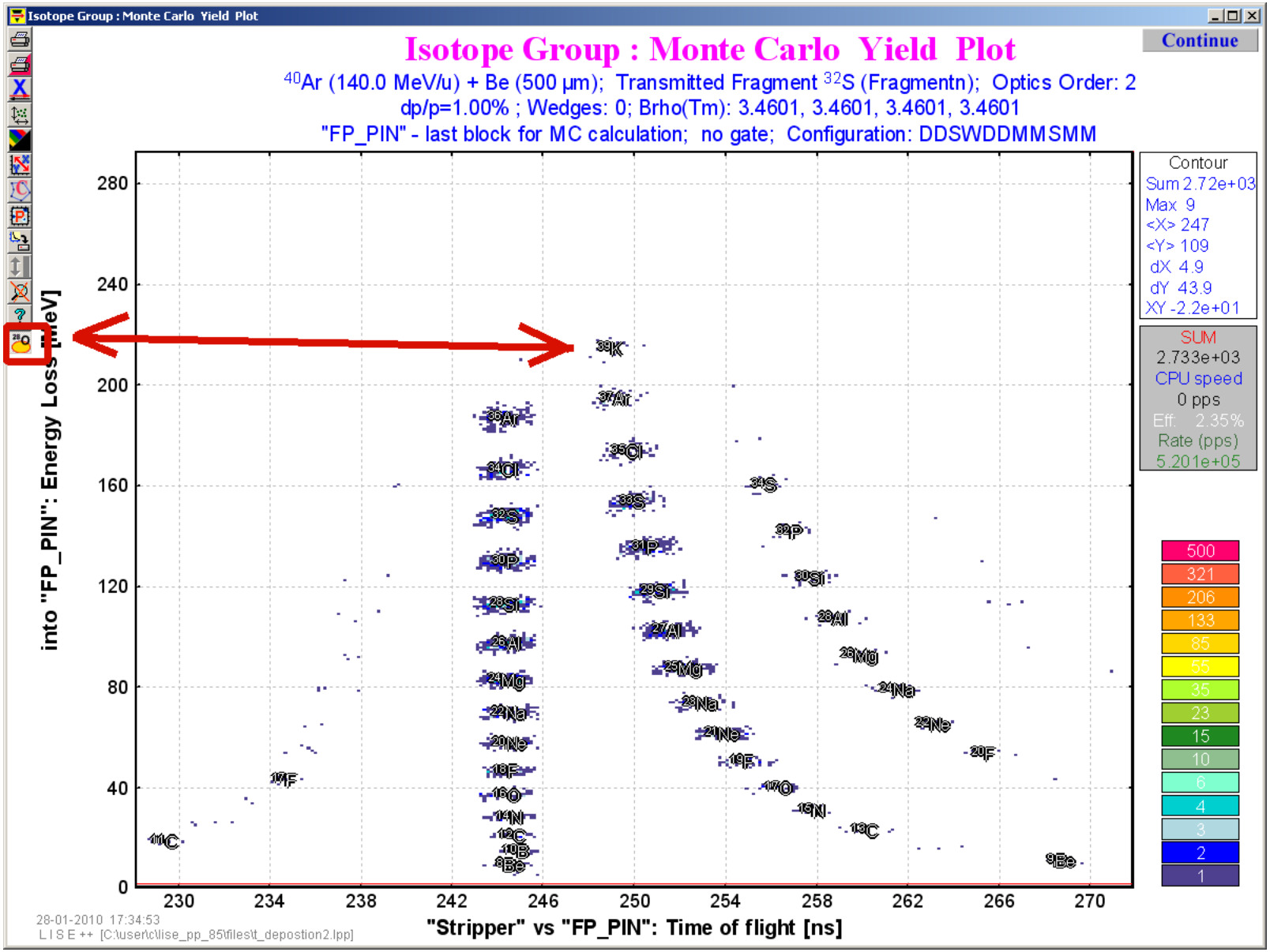

K = MC_transWeight->inter2(….)

Weight: Yield after target(stripper)

K = total % Get_N_MCtrans();

Simple cycle 1…N

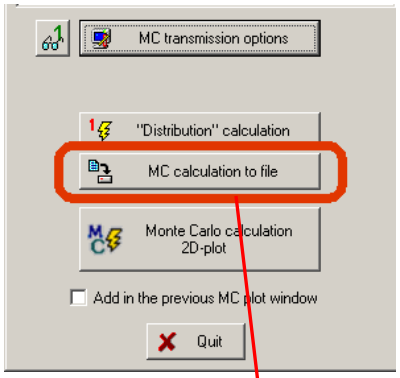
# MC Isotope group : identification

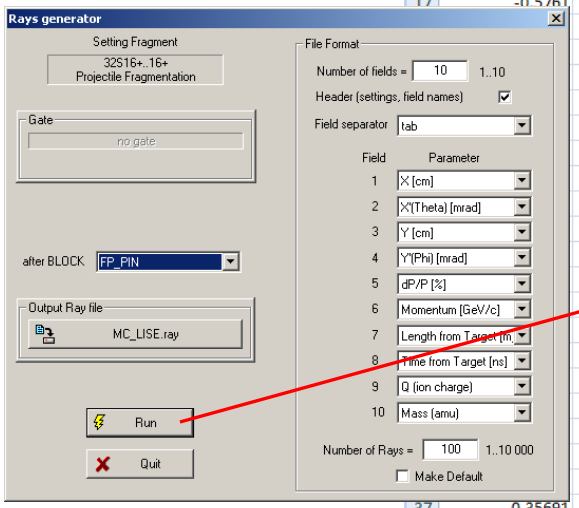



"Off" by default.

A fragment will be identified If its yield > 5 event

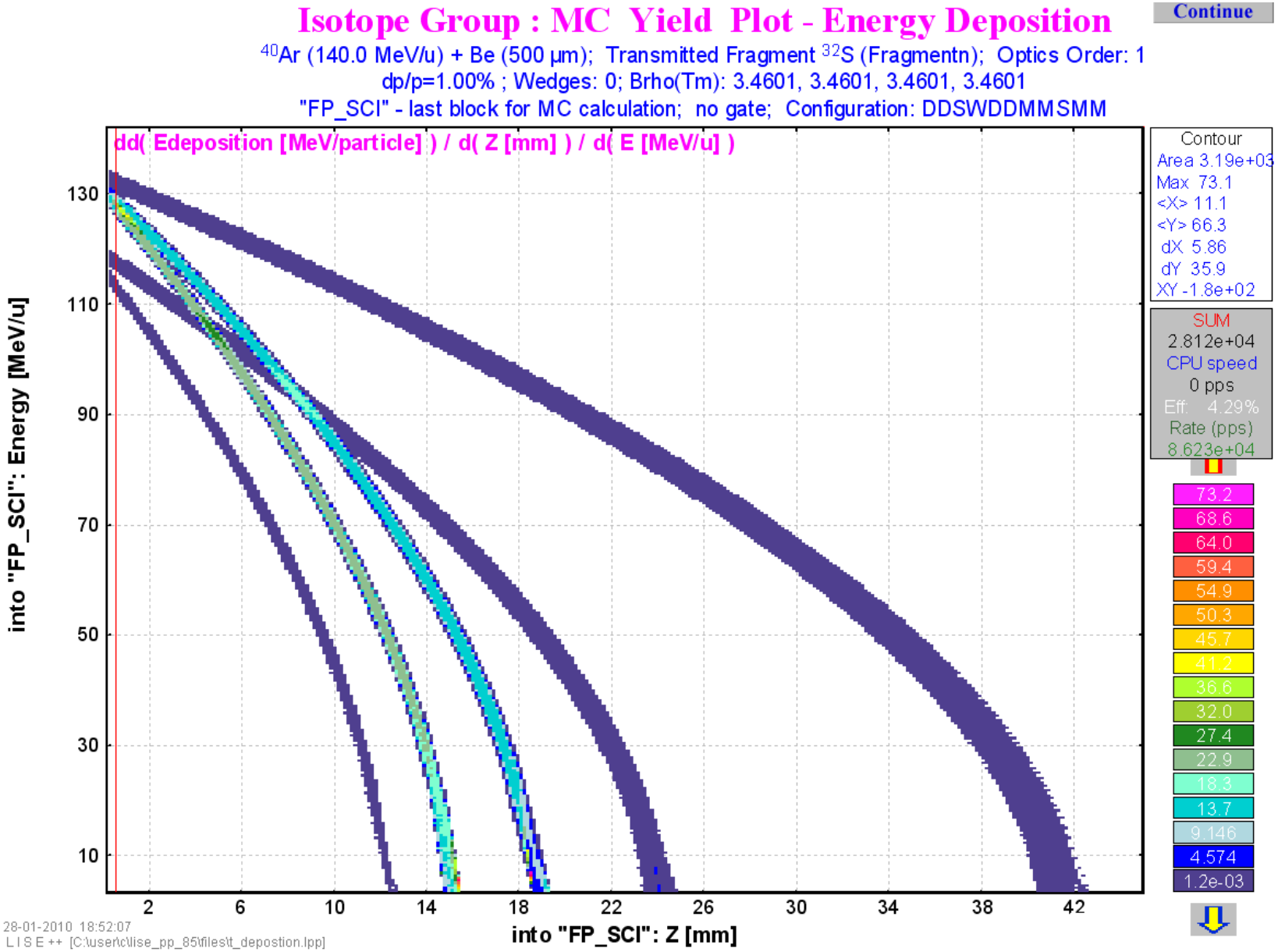
# MC isotope group: writing to file




| | A | B | C | D | E | F | G | H | I | J | K |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | ! after block "D4", setting fragment: 36Cl17+..17+ (Projectile Fragmentation); N_fields=10; N_Rays=1000 | | | | | | | | | | |
| 2 | !X [cm] | X'(Theta) [mrad] | Y [cm] | Y'(Phi) [mrad] | dP/P [%] | Momentum [GeV | Length from Targ | Time from Target | Mass (amu) | Z (atomic number) | |
| 3 | 0.3141 | 16.48 | -0.19515 | -6.4145 | -0.093076 | 6.218 | 35.646 | 244.7 | 12 | 6 | |
| 4 | -0.066887 | 4.9316 | -0.25801 | -5.2656 | 0.21868 | 13.514 | 35.637 | 243.86 | 25.987 | 13 | |
| 5 | -0.10045 | -11.581 | 0.37771 | 6.9876 | -0.2587 | 16.554 | 35.651 | 244.82 | 31.972 | 16 | |
| 6 | 0.30984 | -9.9289 | -0.21728 | 4.9878 | -0.097064 | 16.581 | 35.646 | 244.55 | 31.972 | 16 | |
| 7 | -0.30863 | -3.3237 | 0.084716 | 3.1919 | -0.14441 | 13.465 | 35.648 | 244.62 | 25.987 | 13 | |
| 8 | 0.24019 | 6.4896 | -0.092595 | 2.0442 | -0.16736 | 13.462 | 35.649 | 244.69 | 25.987 | 13 | |
| 9 | -0.13223 | -12.92 | 0.46971 | 18.211 | 0.22304 | 13.515 | 35.637 | 243.99 | 25.987 | 13 | |
| 10 | 0.39374 | -10.248 | 0.0076804 | 2.549 | -0.1058 | 6.2172 | 35.647 | 244.65 | 12 | 6 | |
| 11 | -0.014752 | 6.3074 | -0.36791 | -6.9184 | 0.42216 | 16.667 | 35.631 | 243.38 | 31.972 | 16 | |
| 12 | 0.13938 | -1.95 | 0.33926 | 11.217 | -0.30987 | 16.545 | 35.653 | 244.91 | 31.972 | 16 | |
| 13 | -0.19179 | 2.1879 | 0.43102 | 3.9551 | 0.25944 | 13.52 | 35.636 | 243.8 | 25.987 | 13 | |
| 14 | -0.27829 | -5.1811 | 0.19101 | 1.6669 | -0.14901 | 13.465 | 35.648 | 244.63 | 25.987 | 13 | |
| 15 | 0.22569 | -0.23462 | -0.19355 | -7.5828 | -0.23919 | 16.557 | 35.651 | 244.75 | 31.972 | 16 | |
| 16 | 0.04417 | 10.471 | 0.068924 | 2.7359 | -0.16561 | 17.605 | 35.649 | 255.68 | 35.968 | 17 | |
| 17 | -0.5761 | 6.096 | -0.12868 | 8.9126 | 0.20913 | 16.632 | 35.637 | 243.94 | 31.972 | 16 | |
| | | 5.2983 | -0.0087915 | -0.52082 | 0.0082951 | 16.598 | 35.643 | 244.23 | 31.972 | 16 | |
| | | -0.75389 | -0.14323 | 5.5027 | -0.13704 | 13.466 | 35.648 | 244.66 | 25.987 | 13 | |
| | | -7.78 | 0.15151 | 1.7803 | 0.29637 | 16.646 | 35.635 | 243.64 | 31.972 | 16 | |
| | | 1.5281 | 0.022763 | 6.0434 | -0.31607 | 16.544 | 35.653 | 244.93 | 31.972 | 16 | |
| | | 0.9889 | -0.45096 | -20.268 | 0.079666 | 16.61 | 35.641 | 244.22 | 31.972 | 16 | |
| | | 0.92954 | -0.15519 | -9.2503 | 0.15162 | 13.505 | 35.639 | 244.04 | 25.987 | 13 | |
| | | -6.6547 | -0.052923 | -4.7648 | 0.39323 | 9.3724 | 35.632 | 253.97 | 18.998 | 9 | |
| | | -7.7549 | 0.33702 | 4.5916 | 0.2849 | 13.523 | 35.635 | 243.74 | 25.987 | 13 | |
| | | 9.5151 | -0.40334 | -8.9676 | 0.47006 | 13.548 | 35.629 | 243.37 | 25.987 | 13 | |
| | | -4.081 | 0.15333 | -11.107 | -0.40133 | 16.53 | 35.656 | 245.28 | 31.972 | 16 | |
| | | 9.2426 | -0.20594 | -7.0844 | 0.0051961 | 16.598 | 35.643 | 244.26 | 31.972 | 16 | |
| | | 5.238 | 0.24532 | 4.415 | 0.17984 | 16.627 | 35.638 | 243.88 | 31.972 | 16 | |
| | | -6.8808 | -0.31154 | 2.7543 | -0.33824 | 16.541 | 35.654 | 245.03 | 31.972 | 16 | |
| | | 11.867 | 0.2553 | 16.337 | -0.14953 | 13.465 | 35.648 | 244.8 | 25.987 | 13 | |
| | | -1.6486 | -0.1072 | -9.8393 | -0.27027 | 13.448 | 35.652 | 244.93 | 25.987 | 13 | |
| | | -4.3841 | 0.20712 | 13.39 | -0.31033 | 6.2045 | 35.653 | 245.14 | 12 | 6 | |
| | | -1.2504 | 0.02053 | 1.9638 | -0.073993 | 16.585 | 35.646 | 244.39 | 31.972 | 16 | |
| | | 3.1386 | -0.30699 | -11.312 | -0.23742 | 16.557 | 35.651 | 244.77 | 31.972 | 16 | |
| | | -1.9692 | 0.052723 | -0.3653 | -0.12176 | 16.577 | 35.647 | 244.5 | 31.972 | 16 | |
| 37 | -0.35691 | -0.60786 | -0.26909 | -8.5289 | 0.051949 | 13.492 | 35.642 | 244.22 | 25.987 | 13 | |
| 38 | -0.39463 | 13.747 | 0.10566 | 1.5342 | 0.26468 | 9.3604 | 35.636 | 254.28 | 18.998 | 9 | |
| 39 | 0.3655 | 12.5 | 0.20583 | 2.4739 | -0.27162 | 16.552 | 35.652 | 244.86 | 31.972 | 16 | |
| 40 | 0.29806 | -9.2795 | -0.25572 | 5.0998 | 0.072273 | 13.495 | 35.641 | 244.28 | 25.987 | 13 | |

# MC Isotope group: Energy deposition mode



# MC development plans and Acknowledgements

## Plans for MC development:

- *Secondary target for the Isotope group mode*
- *Envelope*
- *Excitation function*
- *Transmission losses as a function of length*
- *B$\rho$ method to measure $T_{1/2}$ (possibility of decay in flight)*
- *Simulation reactions In Si-telescope*

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