NSCL

LISE++

Version 8.0

Monte Carlo calculation of fragment transmission

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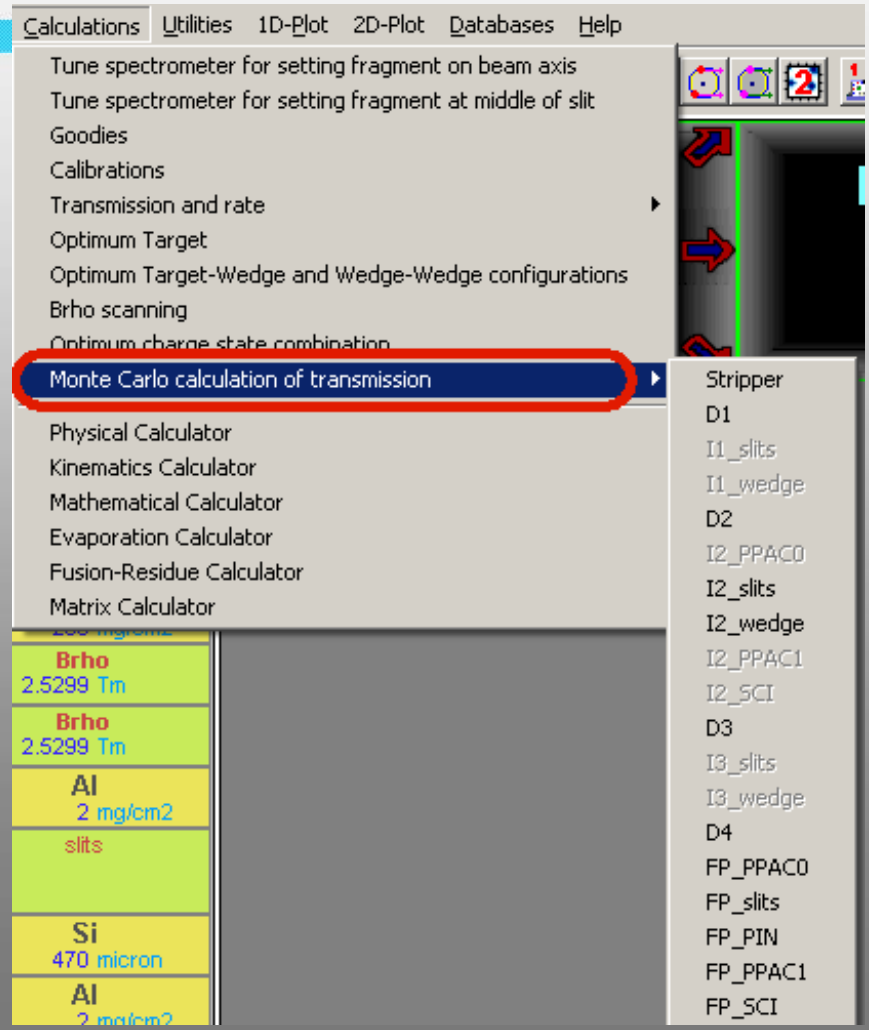
Monte Carlo calculation of fragment transmission



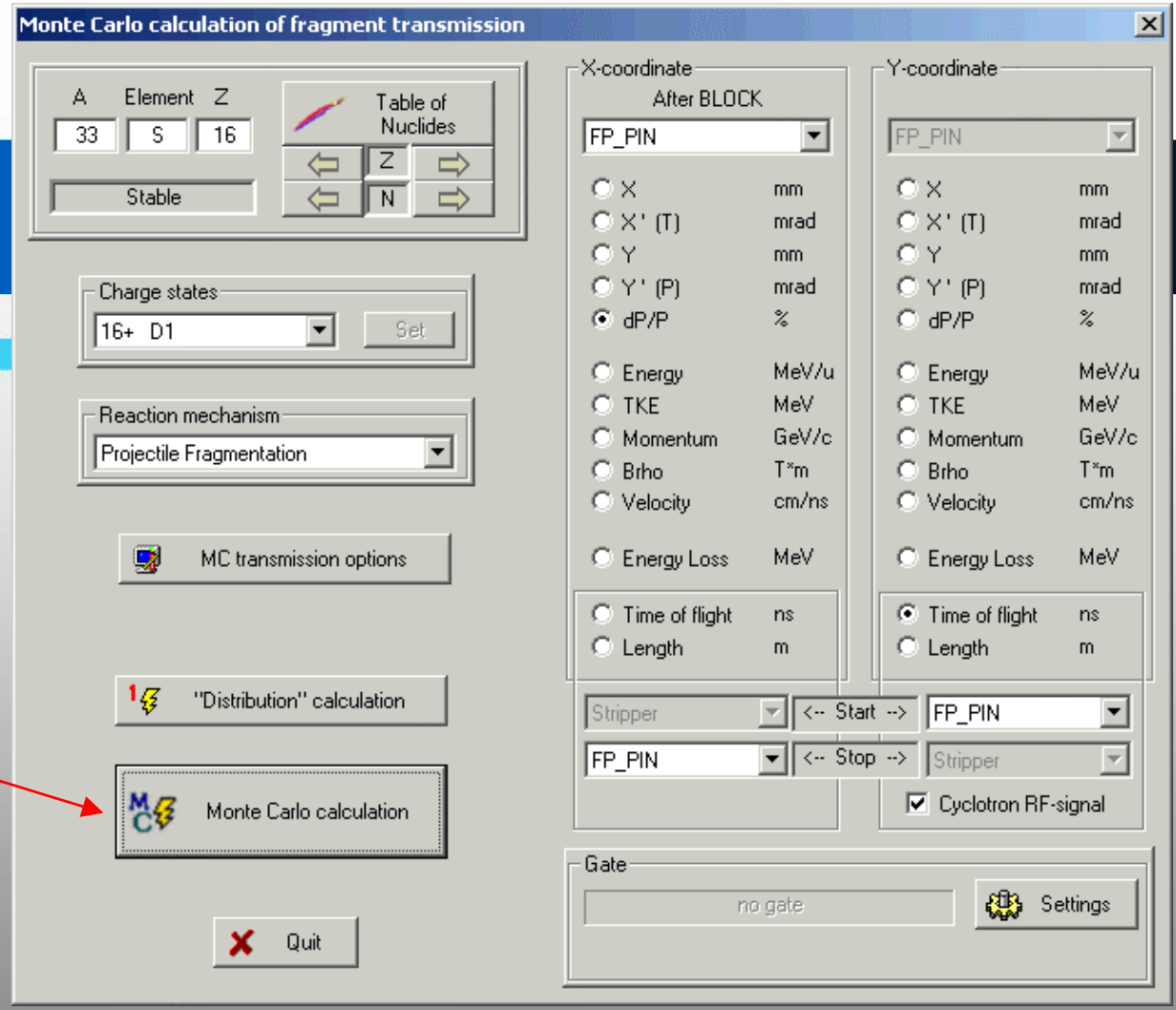
Projectile Fragmentation, Fusion-Evaporation, Fragment production in material are available for MC transmission. Use the Kinematics calculator for fission reactions .

Do not forget: primary beam is good tools to check optics!

Use 5x5 pixel for one event (see the "Plot options" dialog)

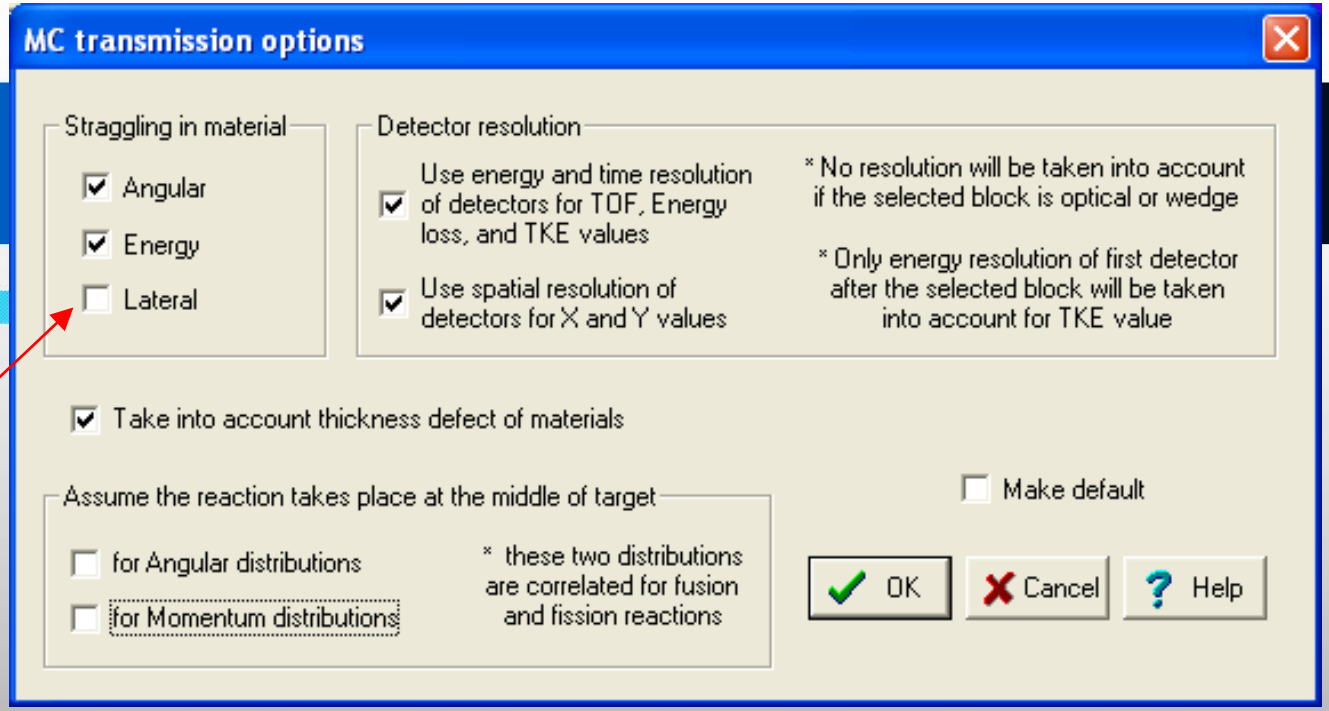
MC transmission dialog

START



- **Detector resolution is optionally taking into account for TOF, TKE and Energy Loss**
- **Only transmission value for angular acceptance and cutting by slits are shown (not Q-state value, loose due to reaction in material, etc)**
- **Transmission value corresponds for Last block used in the calculations (on this dialog for example the last block is "I2_wedge" block)**

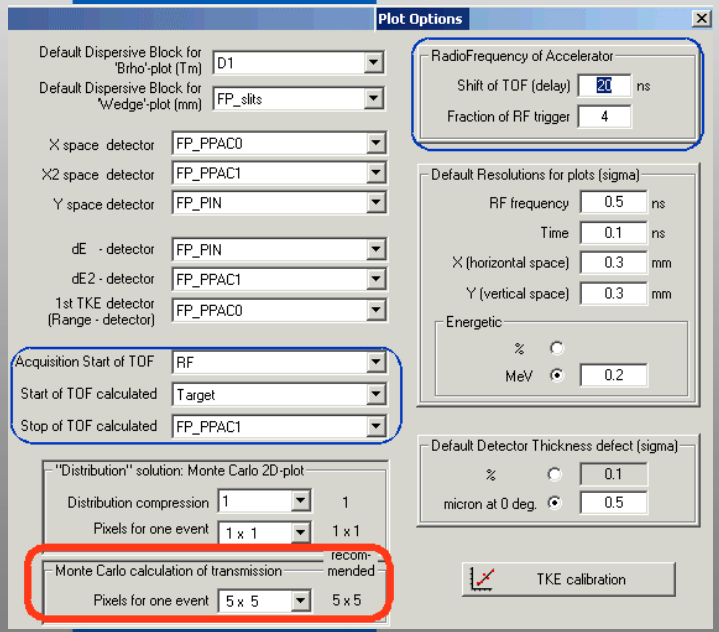
MC transmission options dialog

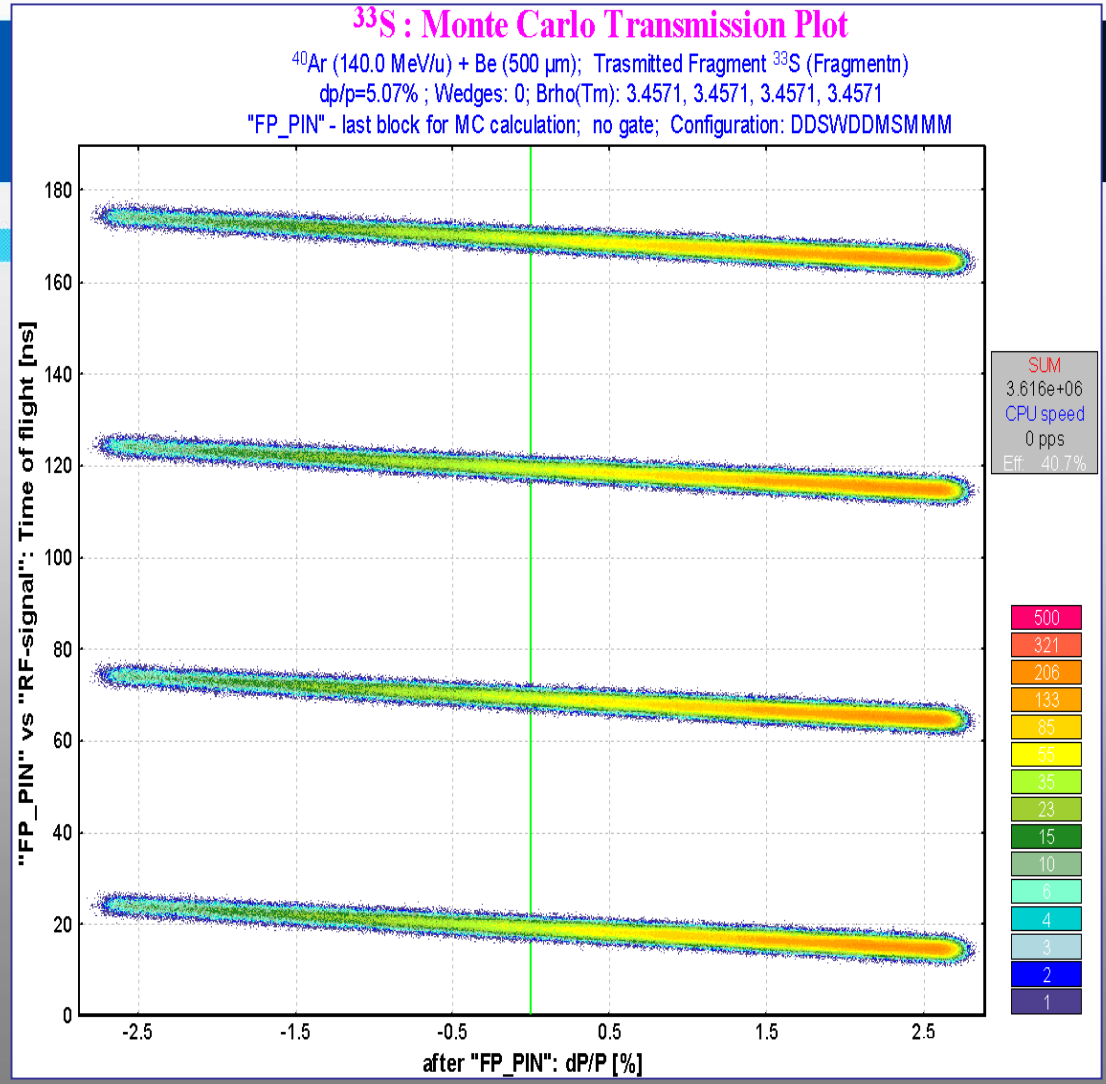


Time consumed

- **Do not use lateral straggling if there are not gas targets or detectors. Otherwise it takes a lot of processor time**
- **Detector resolution is taking into account optionally for TOF, TKE and Energy Loss right now**
- **Assuming that the reaction takes place in the middle of target significantly improve calculation speed especially in the case of use of Convolution method**

Plot options dialog modifications for MC transmission calculations





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5th row of optical matrices should be set correctly to calculate the "Length" value

Optical matrix - D2

$G_i = L_i * G_{i-1}$

G - Global, L - Block (Local)

Matrices: Block (local) / Global

Dimension: mm / cm

Block matrix

1. X	-1.0323	-0.0212	0	0	0	-29.306	/[mm]
2. T	0.0035	-0.9685	0	0	0	-0.1019	/[mrad]
3. Y	0	0	1.1474	-0.0017	0	0	/[mm]
4. F	0	0	4.1106	0.8651	0	0	/[mrad]
5. L	-0.0209	2.8372	0	0	1	-2.4166	/[mm]
6. D	0	0	0	0	0	1	/[%]

Det = 0.99946

Global matrix

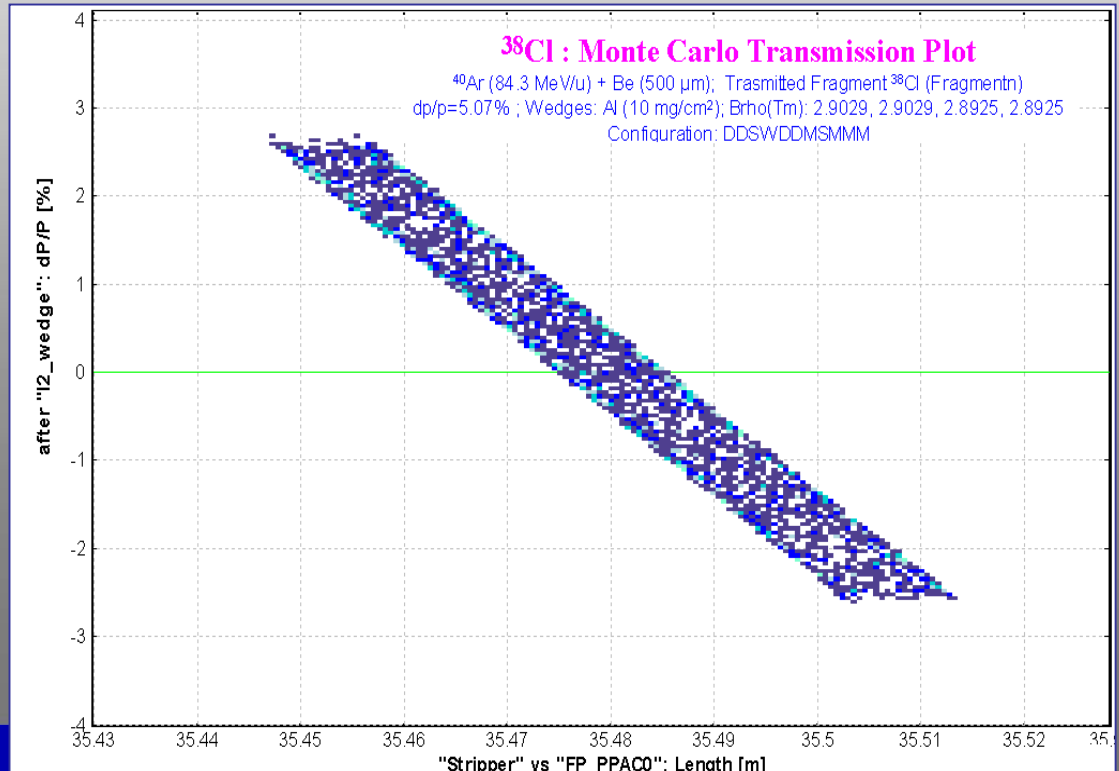
1. X	2.3553	0	0	0	0	-59.125	[mm] /[mm]
2. T	-1.0498	0.4246	0	0	0	-0.0009	[mrad] /[mrad]
3. Y	0	0	0.8406	0	0	0	[mm] /[mm]
4. F	0	0	6.2611	1.1902	0	0	[mrad] /[mrad]
5. L	6.207	-2.51	0	0	1	-5.442	[mm] /[mm]
6. D	0	0	0	0	0	1	[%] /[%]

Det = 1.00073

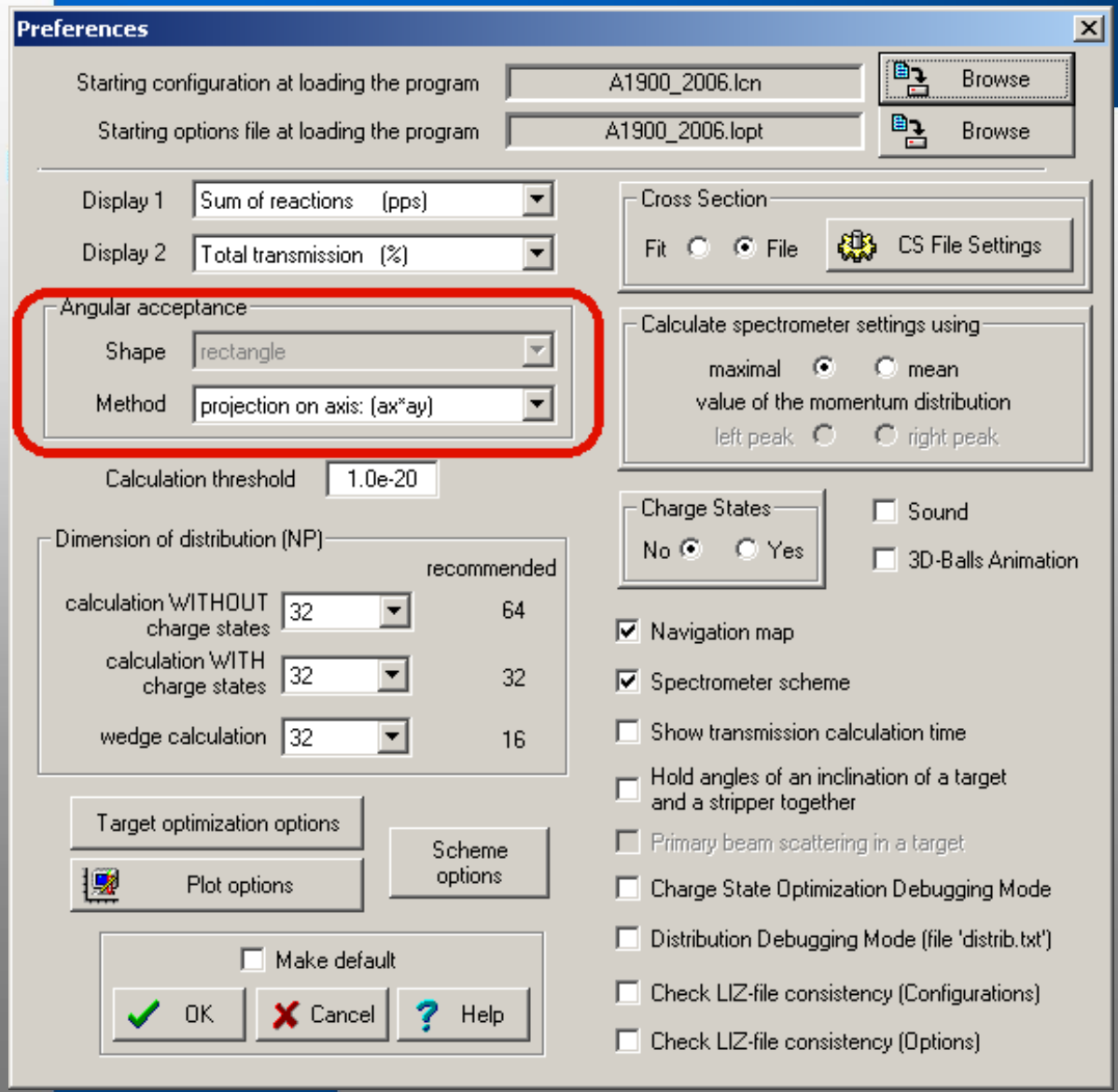
Beam: 6.364, 3.152, 0.841, 11.396, 21.155, 0.1

Dispersive (Dipole) | Ok | Cancel | Help | Spectrometer matrix

New A1900 file contains the correct "dL" – row to calculate the "Length" value in MC mode.



Angular acceptance transmission

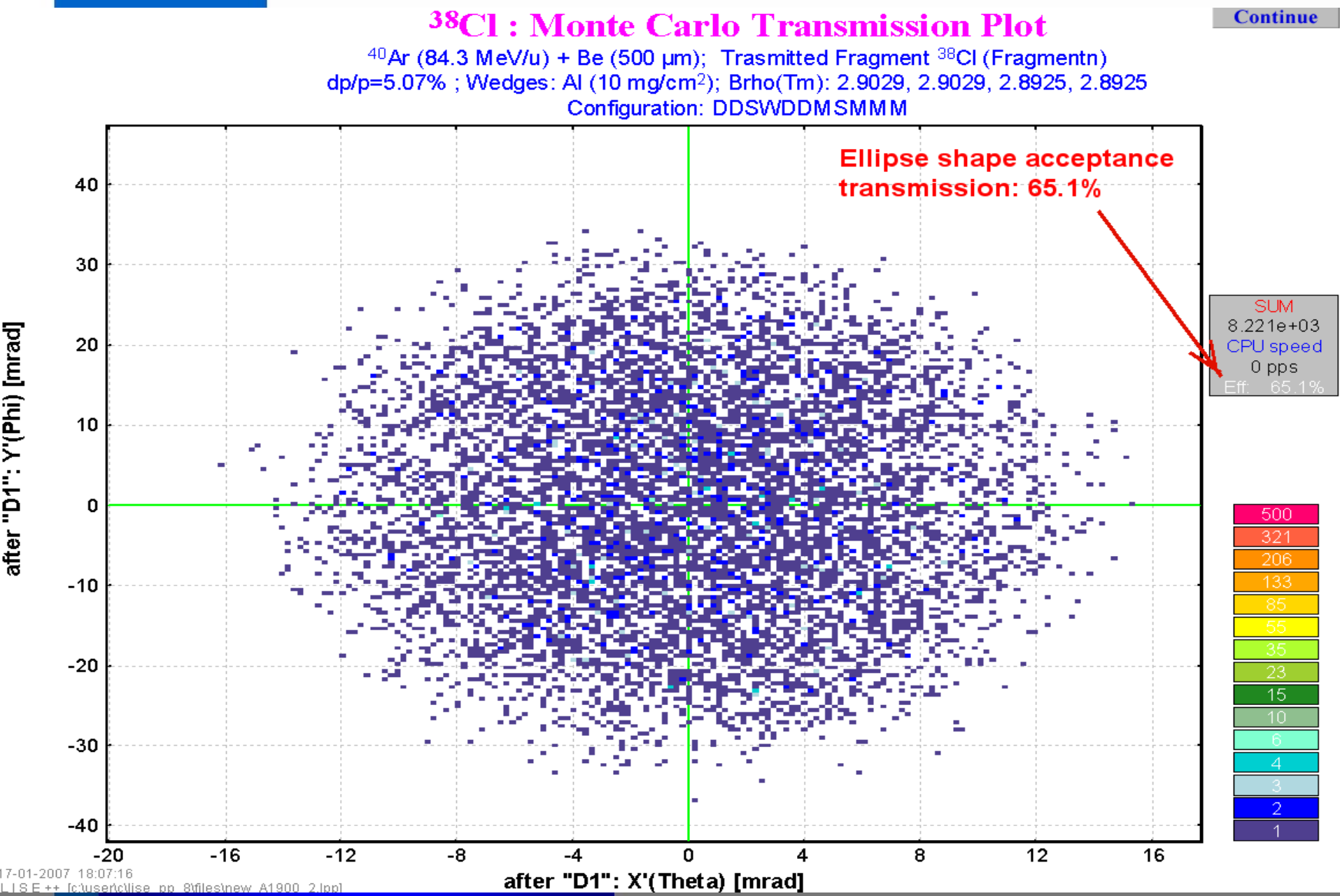


In the "Preference" dialog it is possible to choose an angular acceptance method to be used in the code.

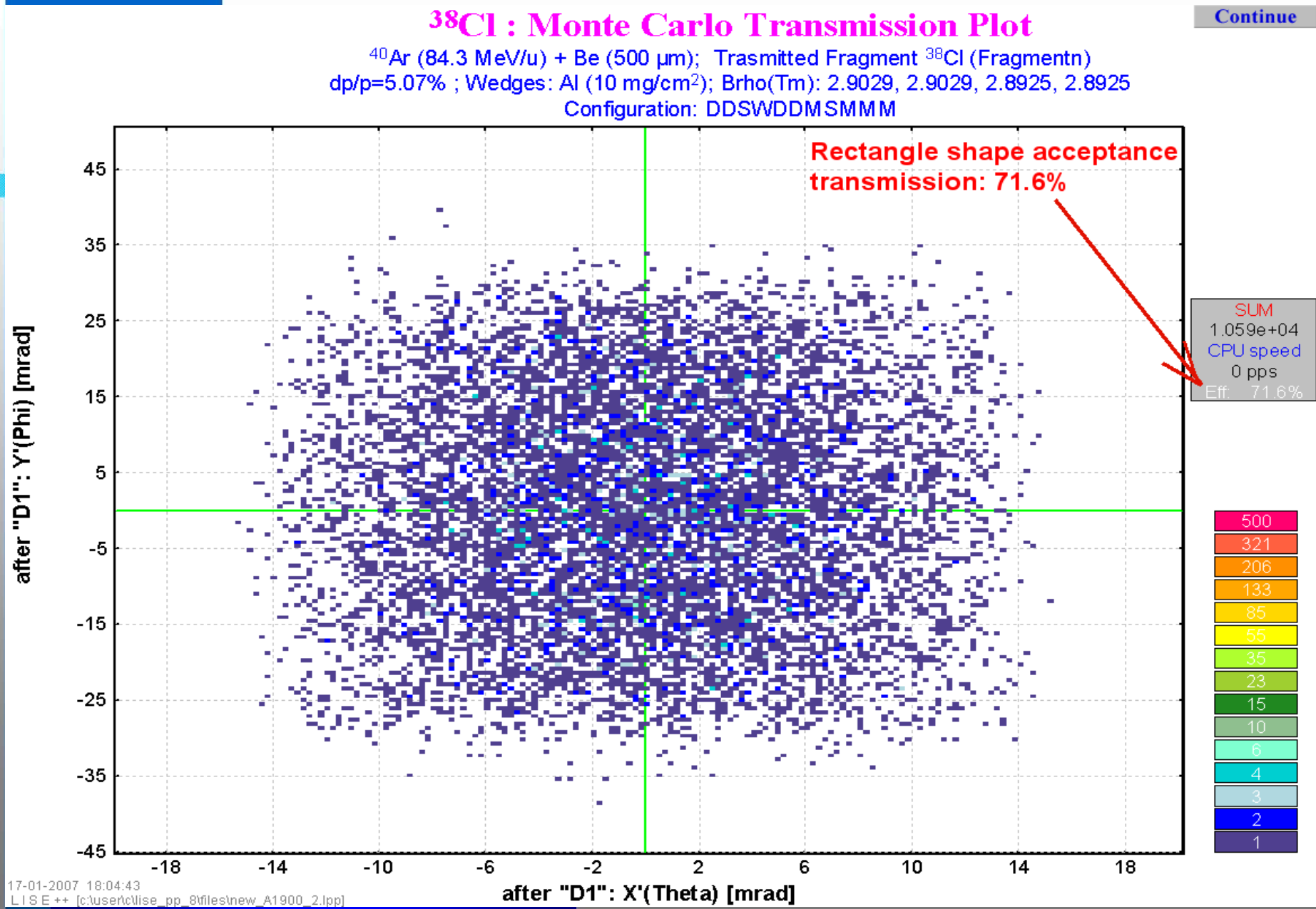
Method "Projection on axis" corresponds to the Rectangle shape.

Method "Jacobian" corresponds to the Ellipse shape

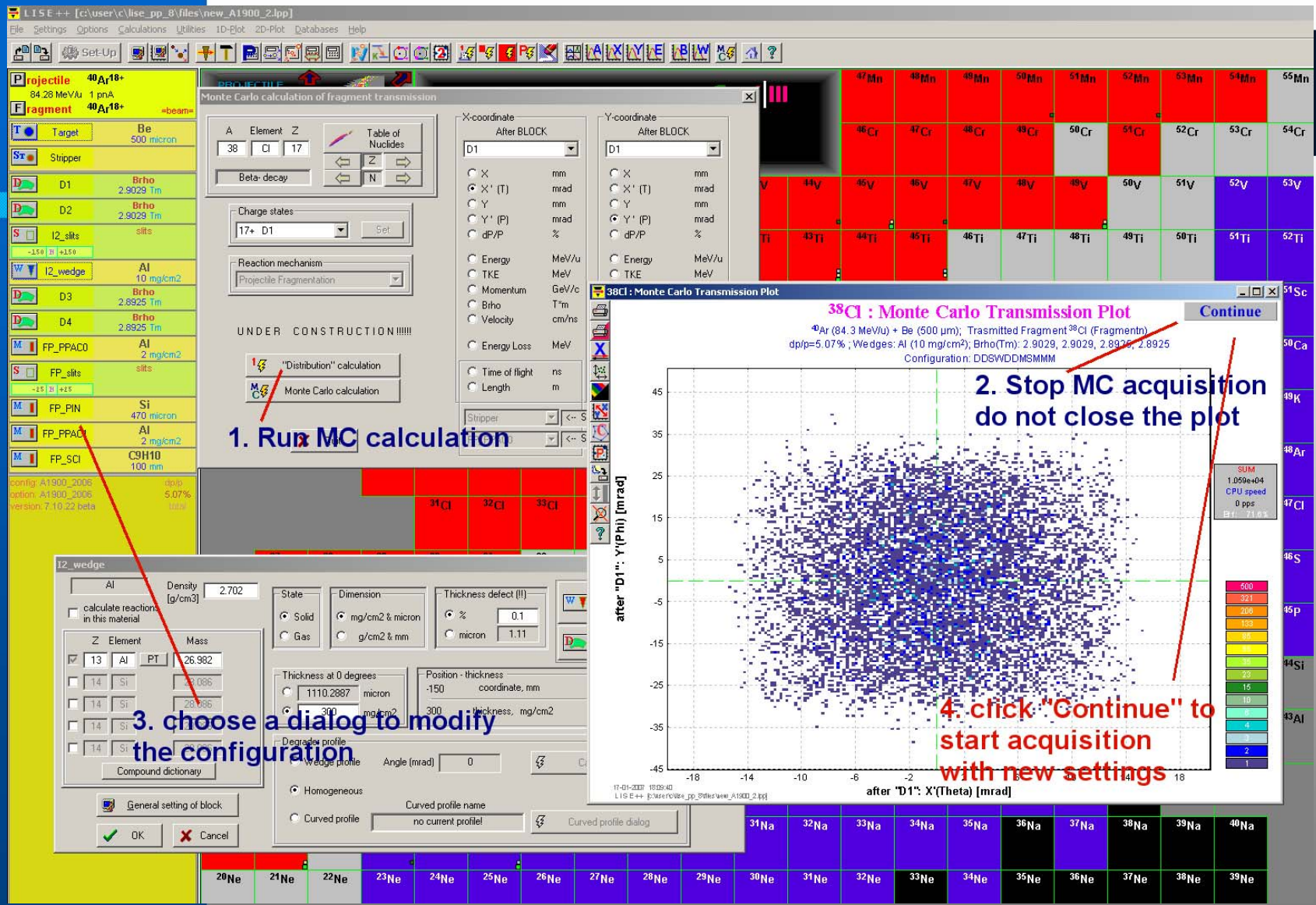
Angular acceptance transmission: Ellipse shape



Angular acceptance transmission: Rectangle shape

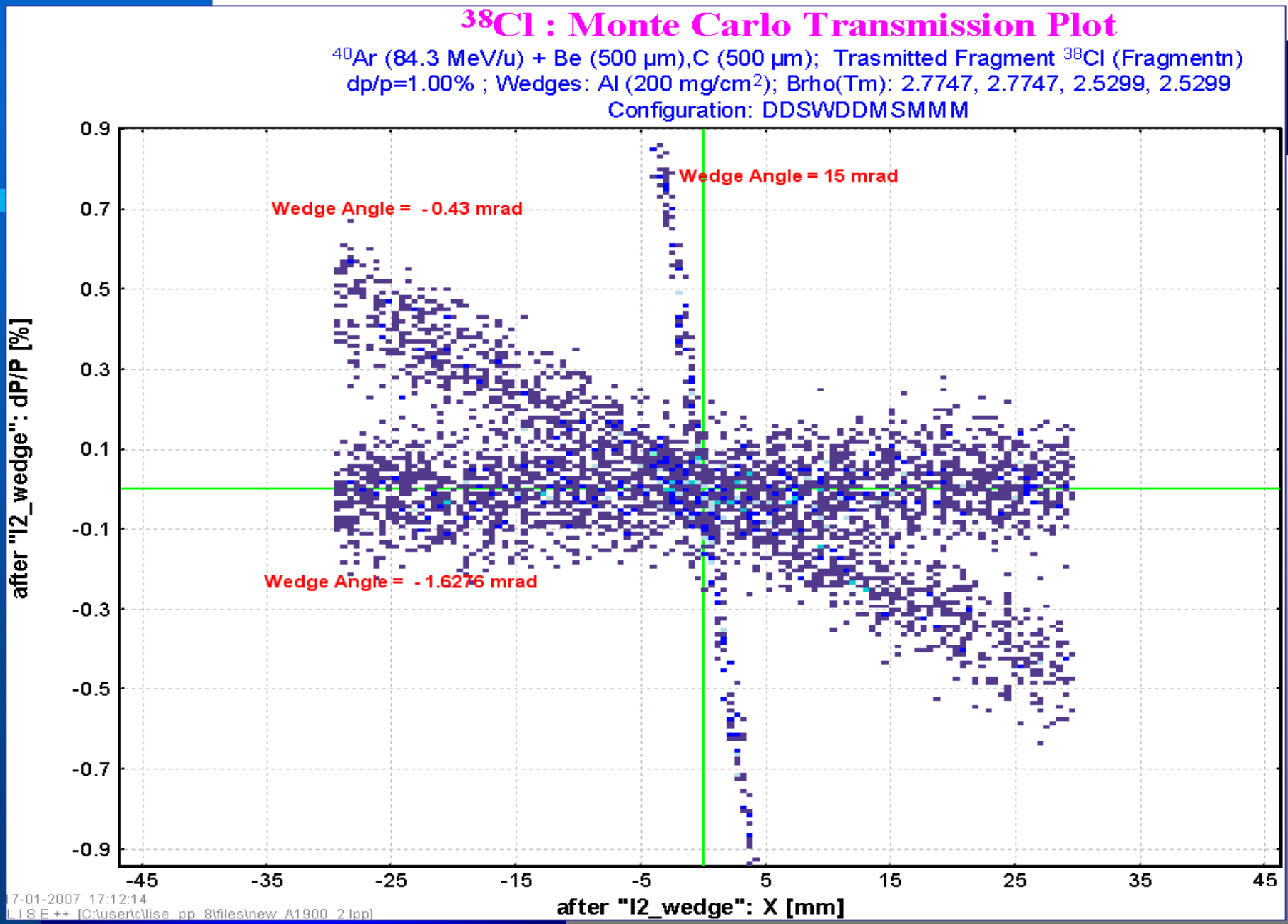


Several different settings in one plot



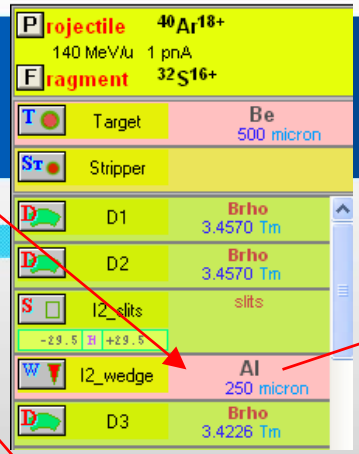
The Efficiency value on plot is average value of all accumulated events for all settings

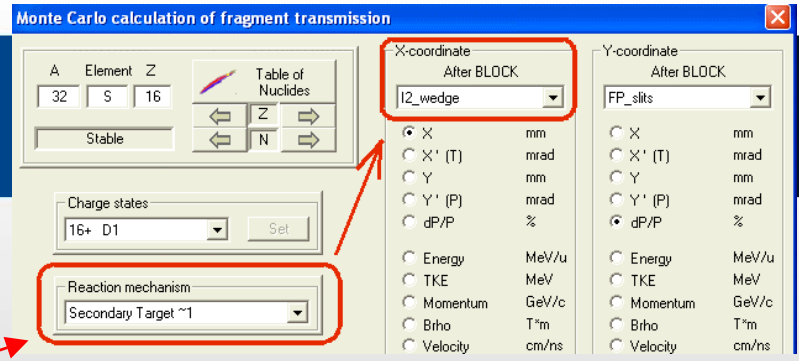
Several different settings in one plot: example

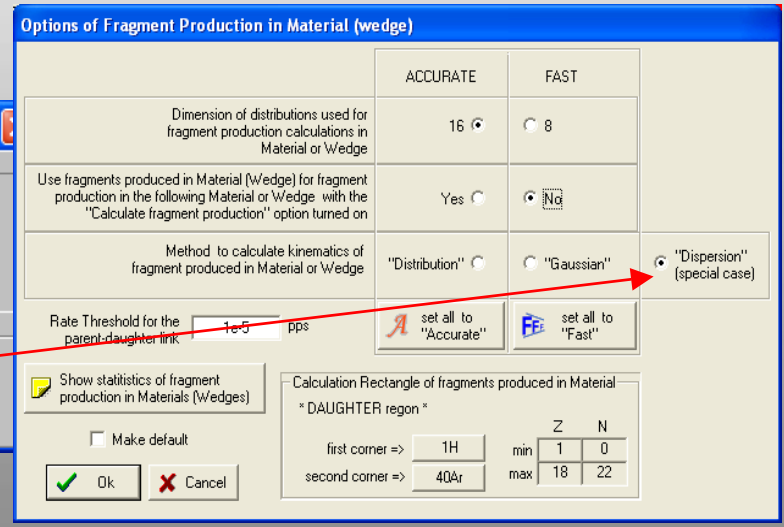


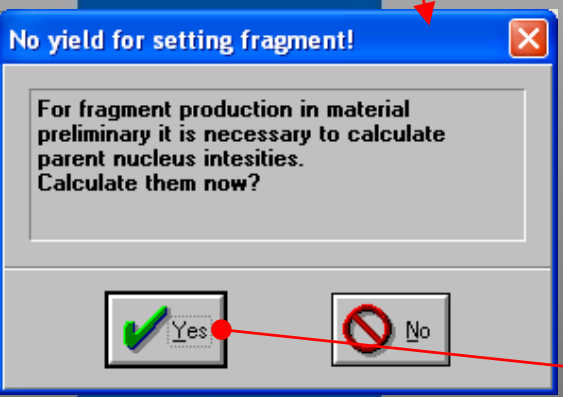
MC transmission and Reactions in wedge (FPinM)

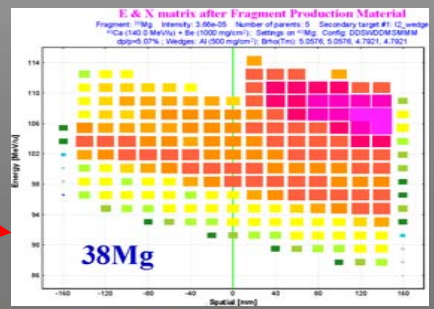
- In the case of FPinM option (Secondary target) the code calculates values beginning from this fragment production block and downstream.
- Dispersion method should be used for FRinM
- If the FPinM database of parent nuclei is empty then the code proposes to calculate it to use the final "Dispersive E-X" matrix as start point







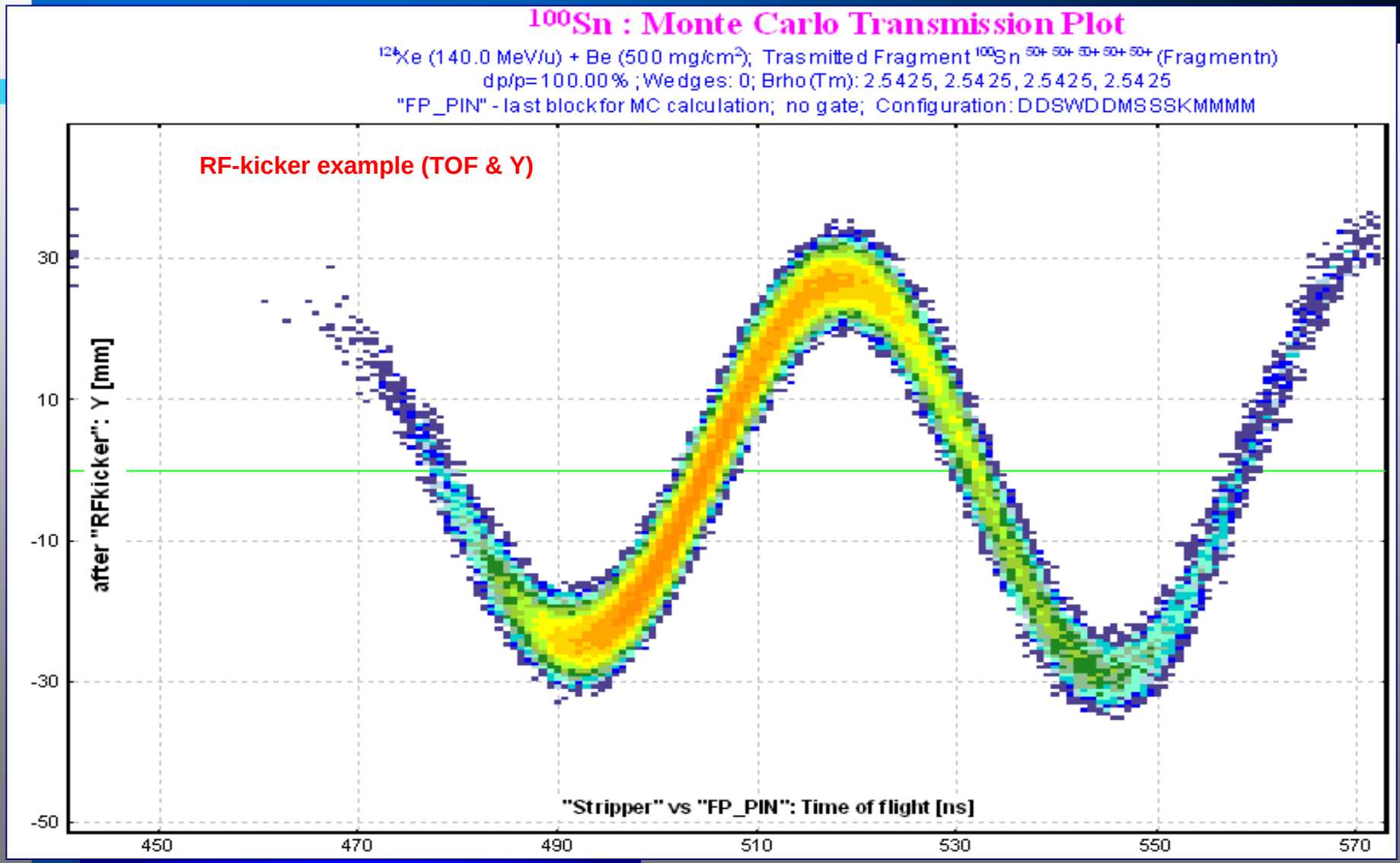




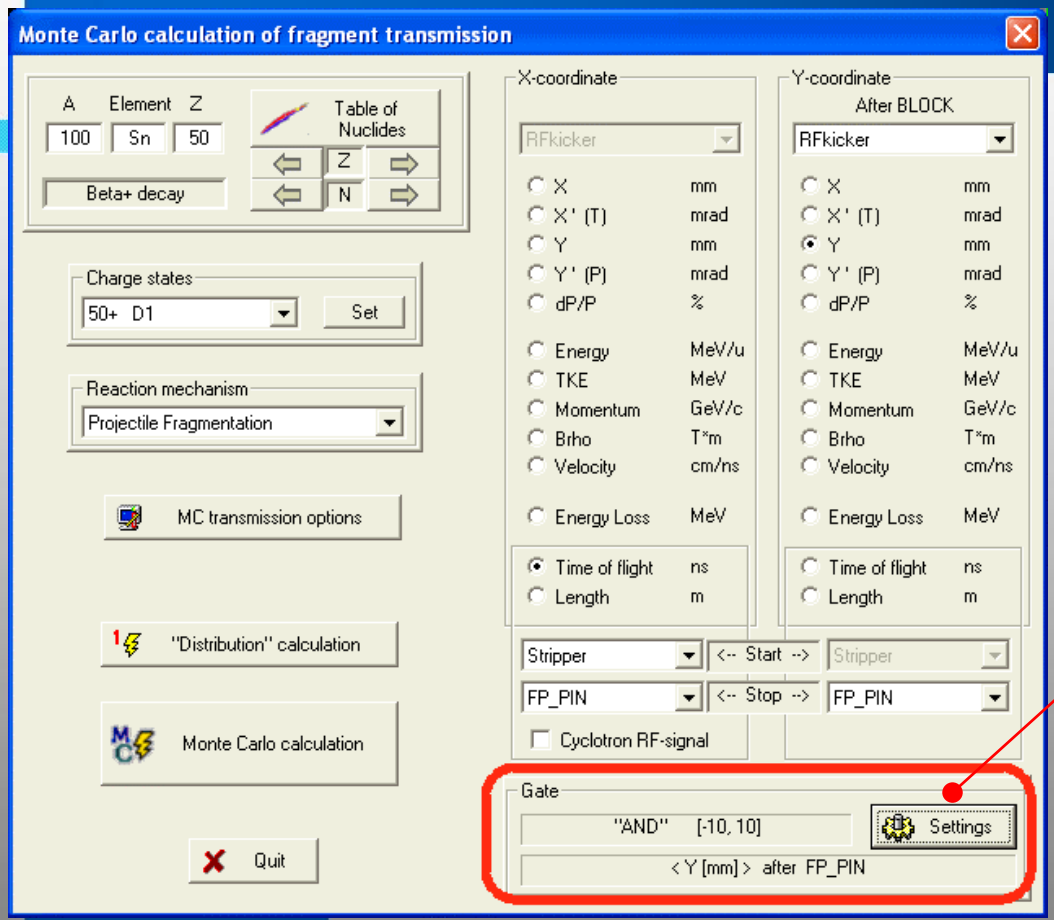
See details for FPinM
http://groups.nscl.msu.edu/lise/8_0/secondary_targets.pdf

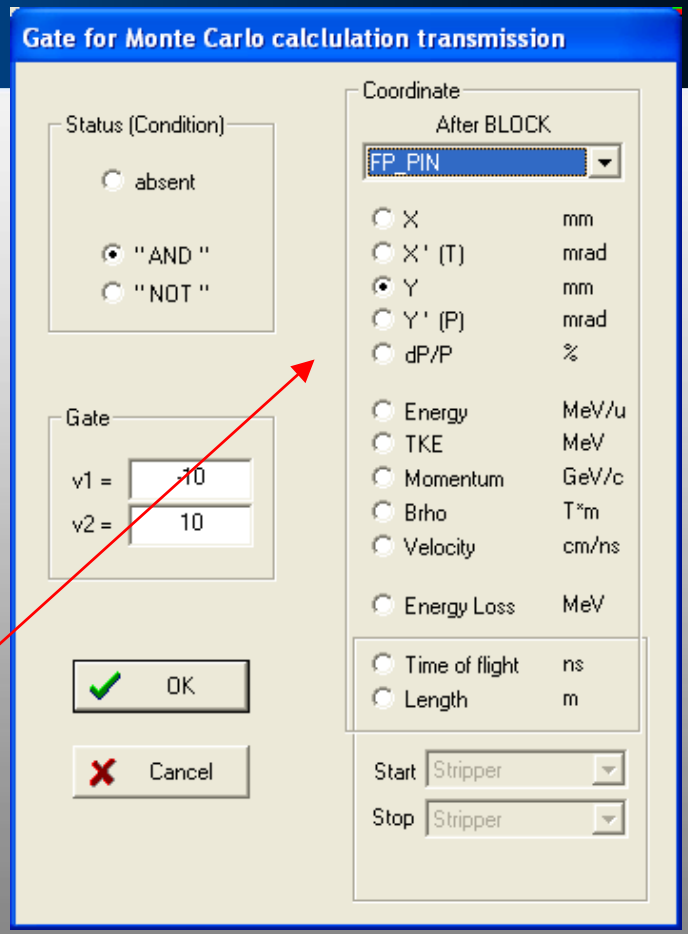
LISE++ blocks & MC transmission

All LISE++ blocks were adapted for MC transmission including Gas-filled separator, Wien–filter, and RF-kicker. All remarks will be appreciated.



Selection Gate





Selection Gate