LISE++

Version 8.0

Fragment production in Material (FPiM)
Monte Carlo transmission of fragment
New utilities and Modifications

Contents:

www.nscl.msu.edu/lise
dnr080.jinr.ru/lise

East Lansing
May 04, 2007

1. Fragment production in Material (FPiM)

Use the following link: http://groups.nscl.msu.edu/lise/8_0/secondary_targets.pdf

2. Monte Carlo transmission of fragment

Use the following link: http://groups.nscl.msu.edu/lise/8_0/monte_carlo.pdf

3. LISE++ possibilities to estimate energy losses in materials

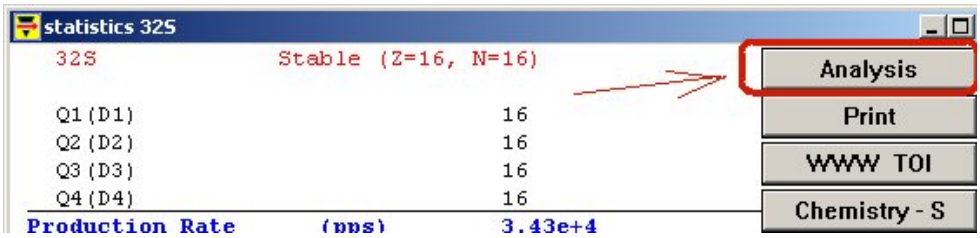
Use the following link: http://groups.nscl.msu.edu/lise/8_0/methods.pdf

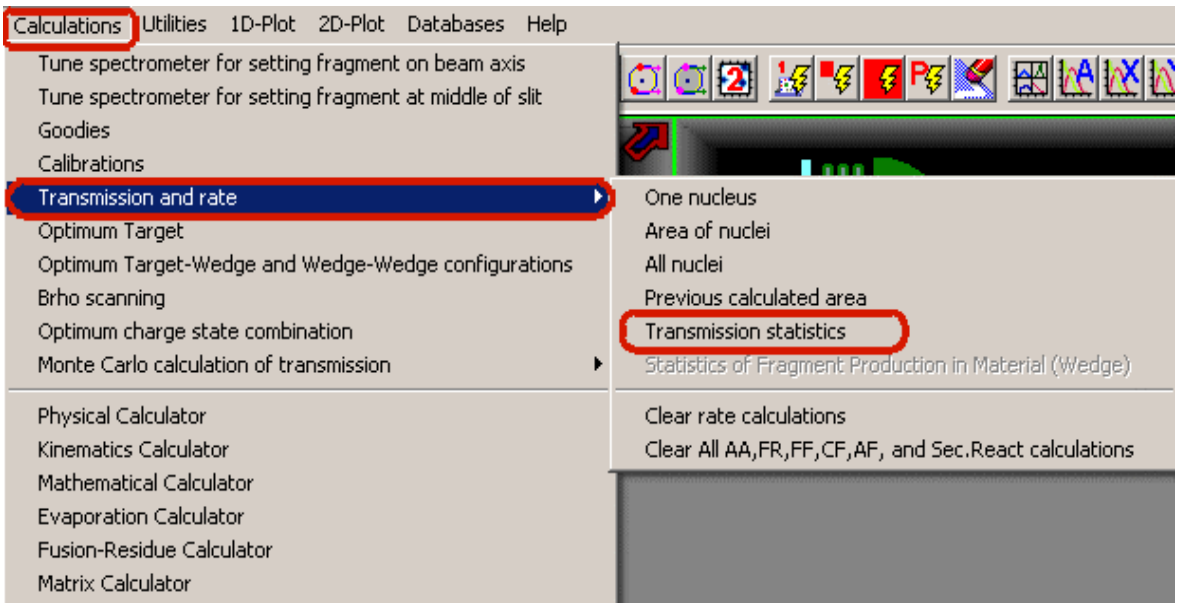
4. New features

4.1. Transmission Statistics Dialog

There are two ways to reach this dialog

- **through the "Calculations" menu**
- **using the "Analysis" button in the "Statistics" window (after clicking by right button of mouse on an isotope of interest in the table of nuclides)**

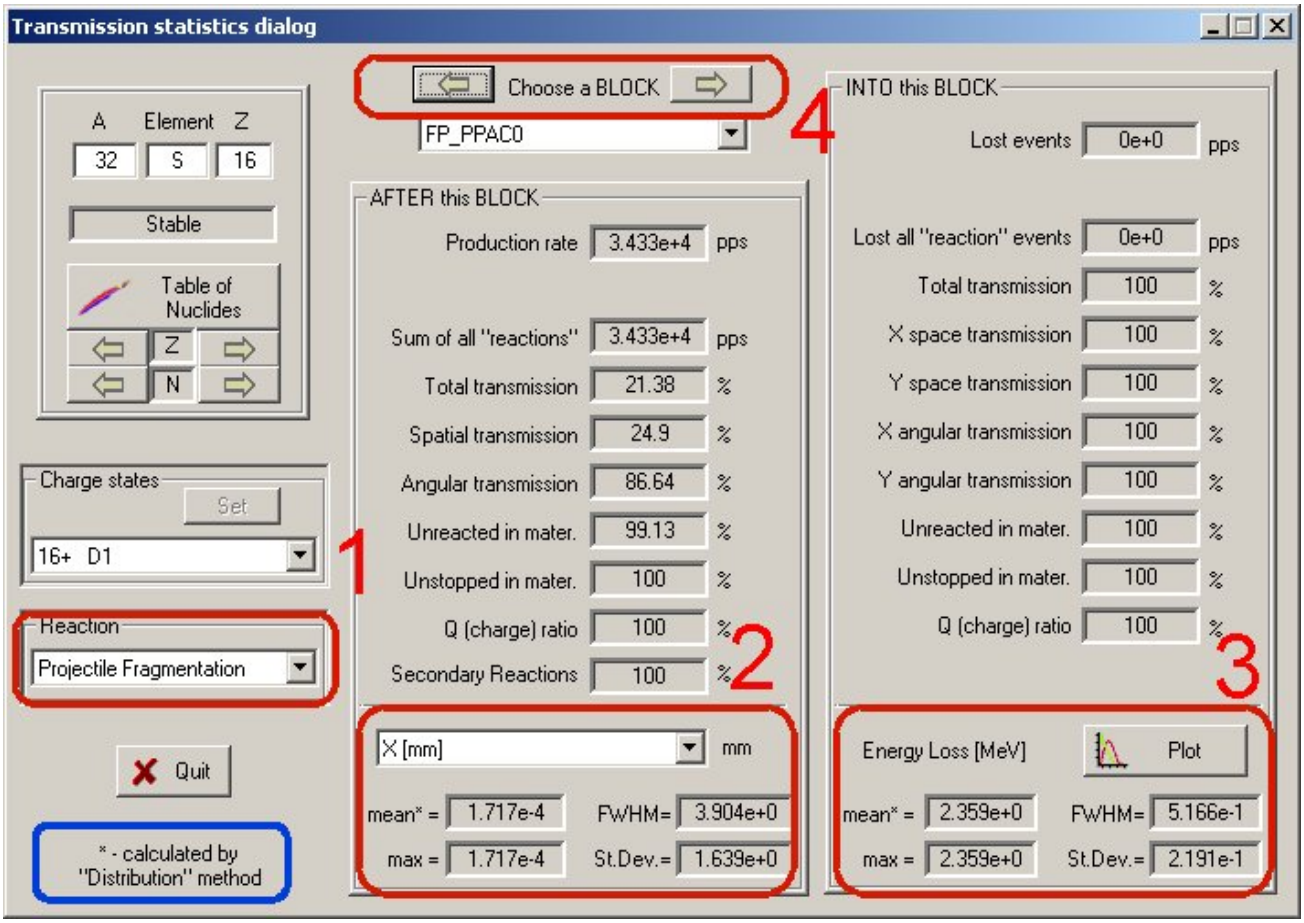




1. Possibility to choose determinate reaction in which the fragment of interest was produced
2. Statistical characteristics of distributions after the selected block

X [mm]
X'(Theta) [mrad]
Y [mm]
Y'(Phi) [mrad]
dP/P [%]
Energy [MeV/u]
TKE [MeV]
Momentum [GeV/c]
Brho [T*m]
Velocity [cm/ns]

3. Statistical characteristics of distribution of energy loss in materials as well as possibility to plot this distribution.
This is unique place in the code where it is possible to plot an energy loss obtained by the "Distribution" method
4. "Previous" and "Next" navigation buttons between blocks

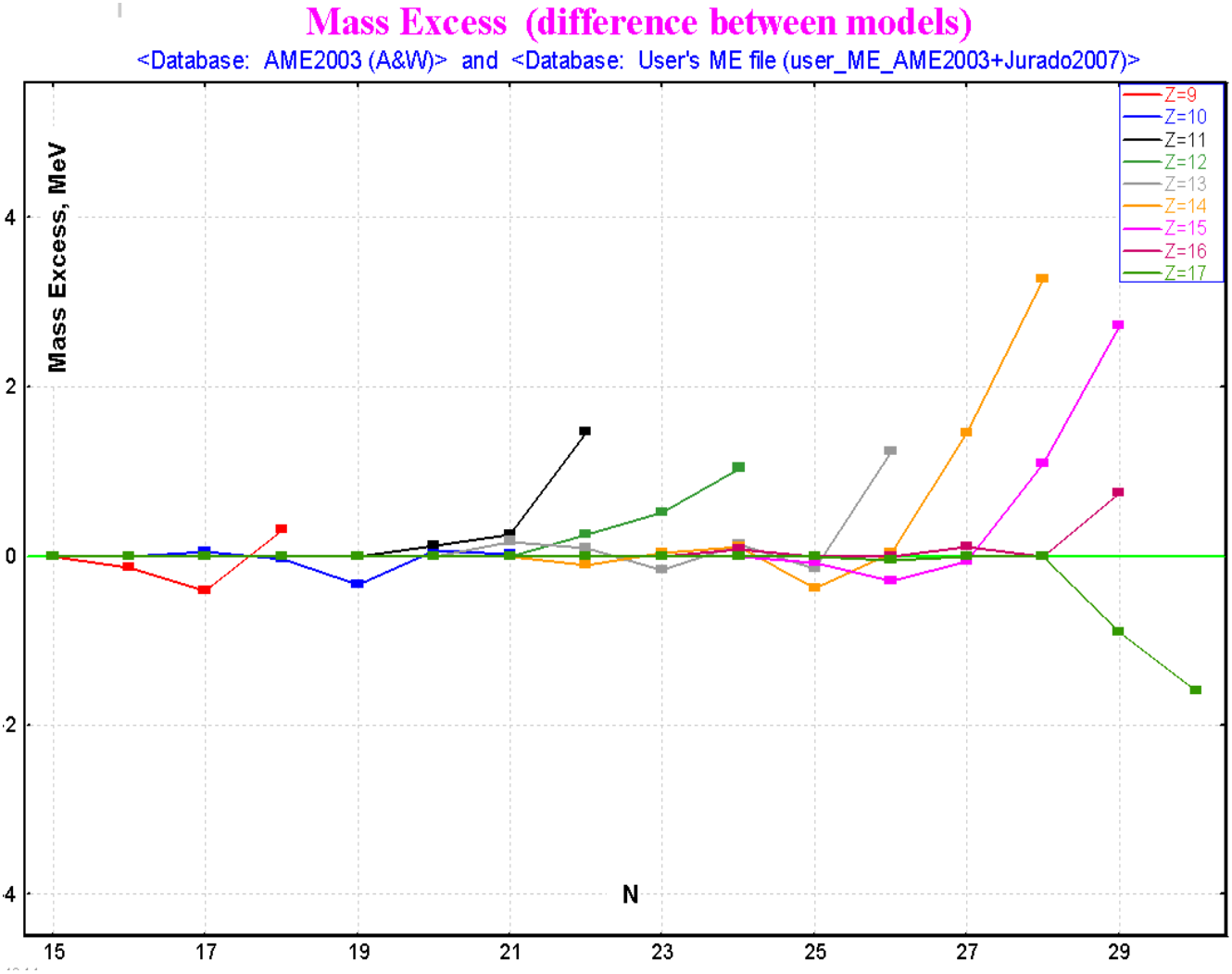


4.2. Mass databases

4.2.1. New user mass excess files

New user mass excess file "user_ME_AME2003+Jurado2007.lme" is based on AME2003 and recent experimental data from recent work of B.Jurado et al., PLB(2007)

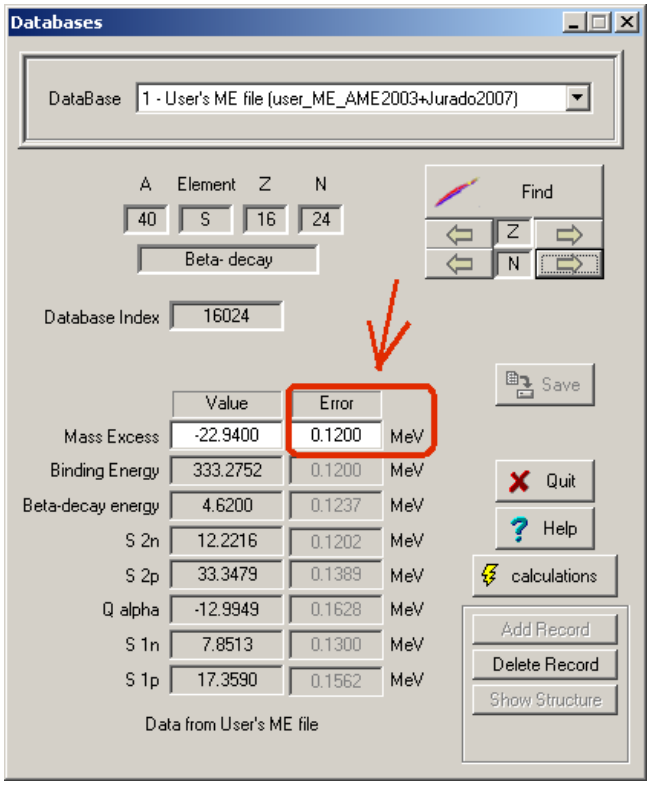
http://dx.doi.org/10.1016/j.physletb.2007.04.006

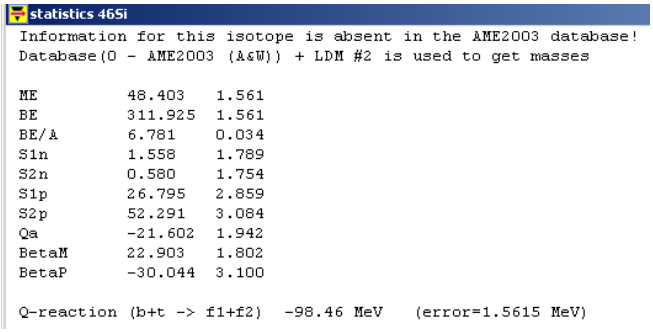


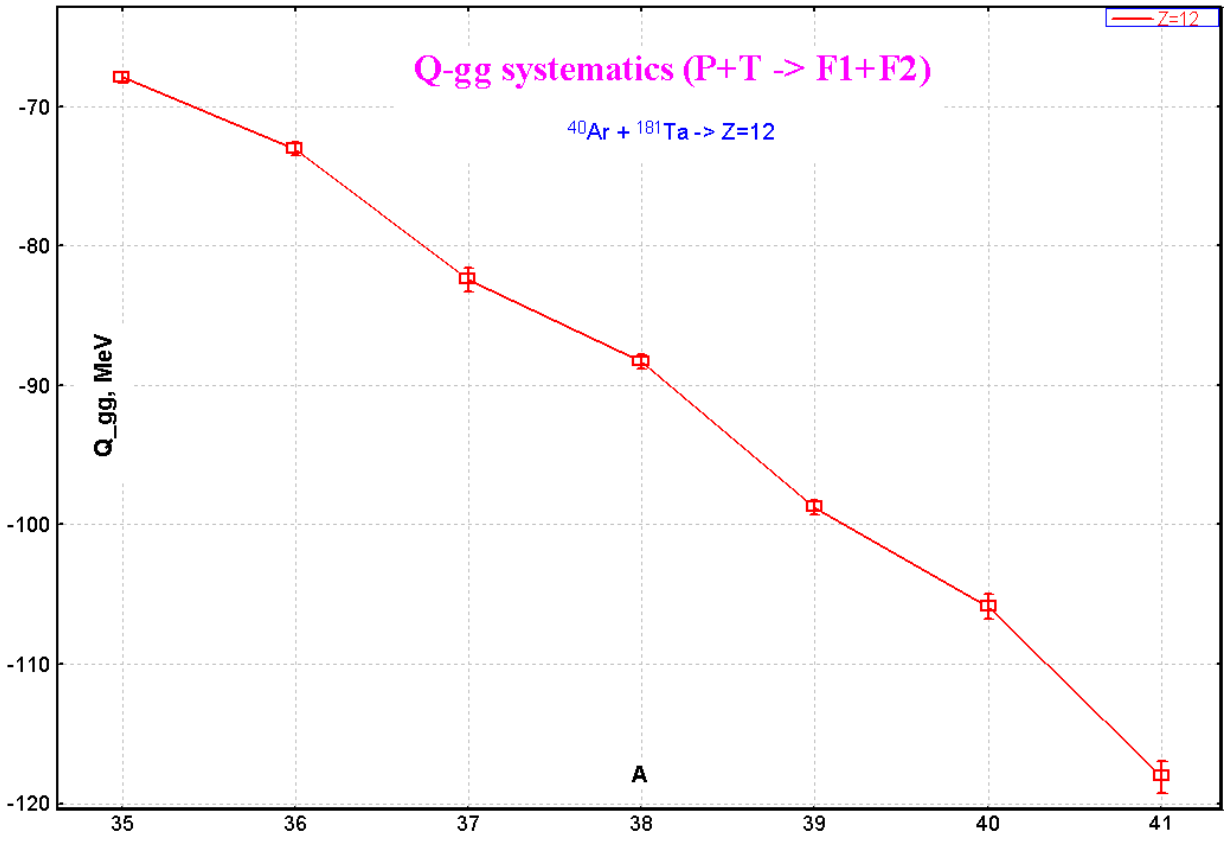
New user mass excess file "user_ME_AME2003+Jurado2007+O.lme" is based on the "user_ME_AME2003+Jurado2007.lme" file with mass excess values for ^{28}F, ^{37}Mg, $^{40\text{-}43}$Al, ^{43}Si, ^{45,46}P manually set in order to correspond to the particle-bound & unbound experimental picture.

4.2.2. Mass Errors

- Mass excess errors can be edited in the Database dialog and being plotted.
- Mass excess errors can be kept in User Mass Excess file
- Calculation of error for mass excess extrapolation
- Calculation of error for Q-value of reaction



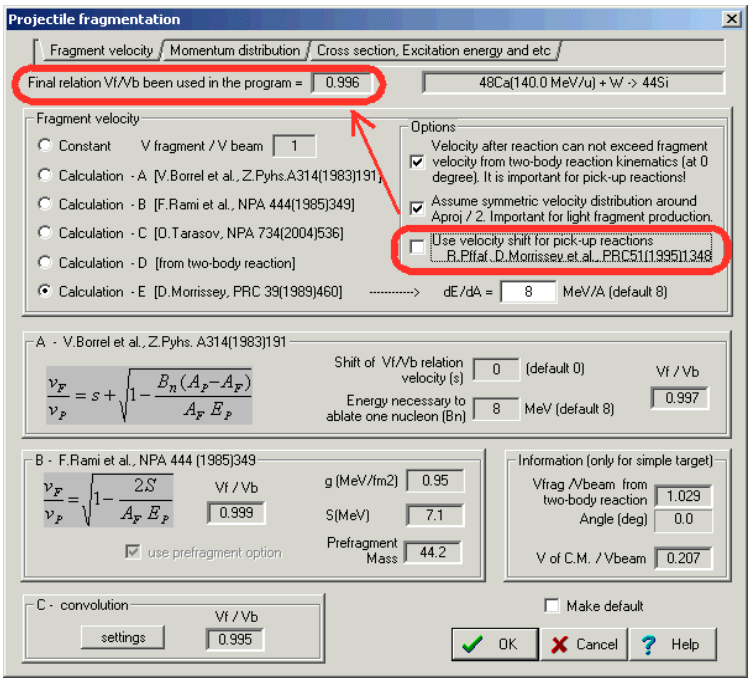


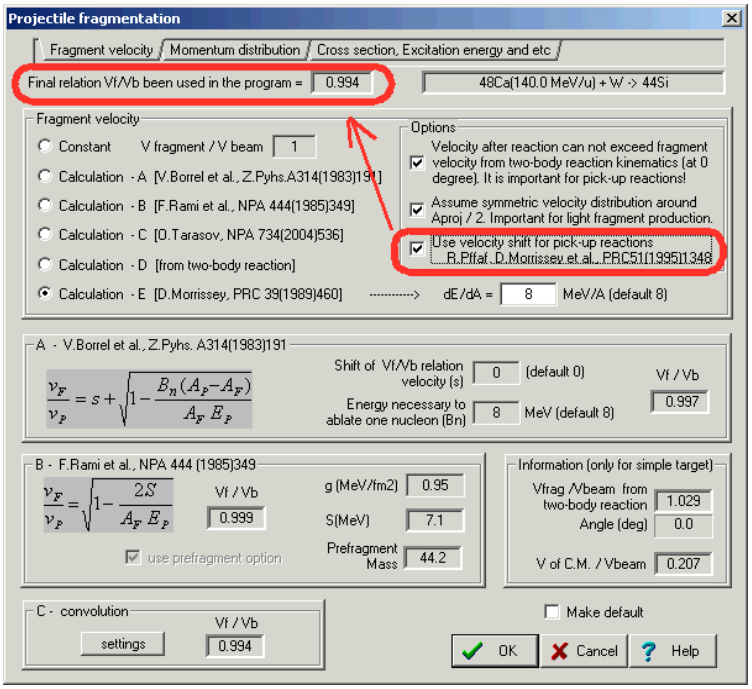


4.3. Pick-up

4.3.1. Momentum distribution

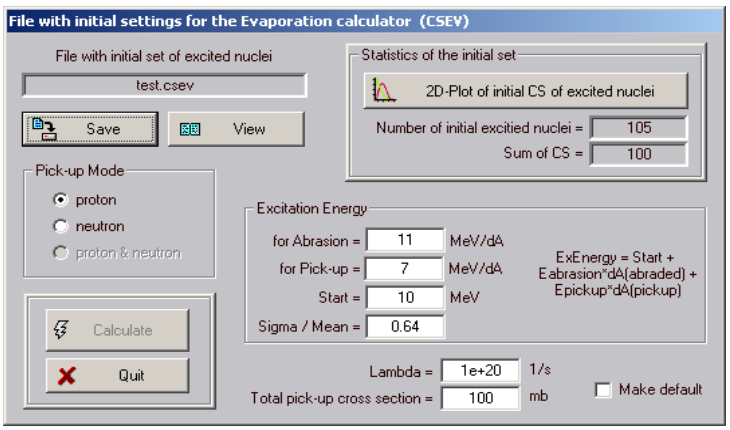
Pickup corrections for momentum distributions in the "Fragmentation" dialog based on the R.Pffaf, D.Morrissey et al., PRC51 (995) 1348) paper.





4.3.2. File with initial cross sections for pick-up case (under construction)

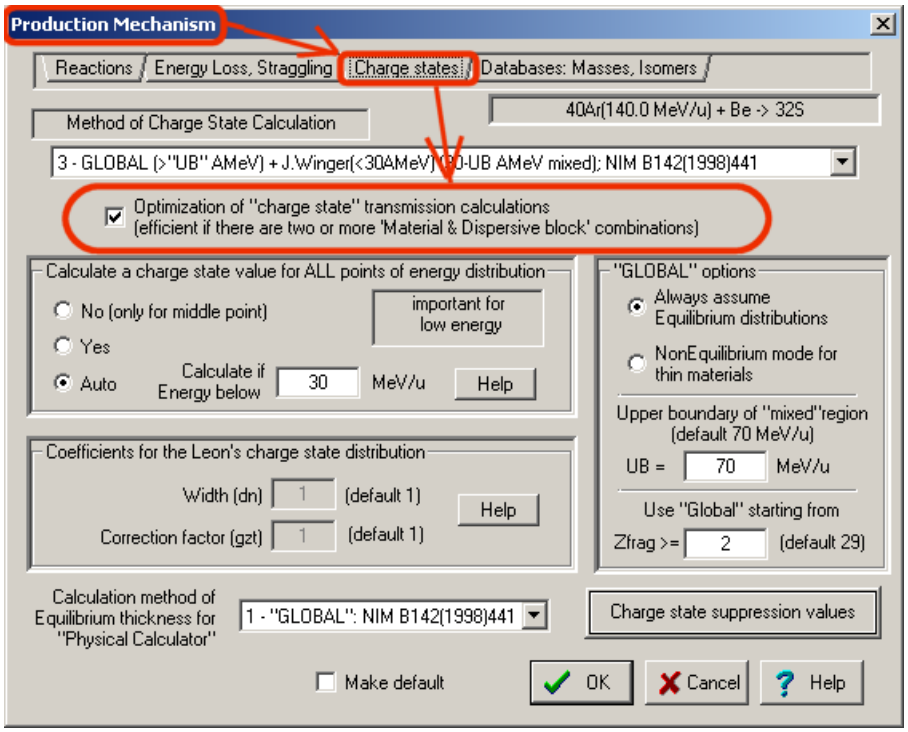
Through the “Utilities” menu.
Under constructions.



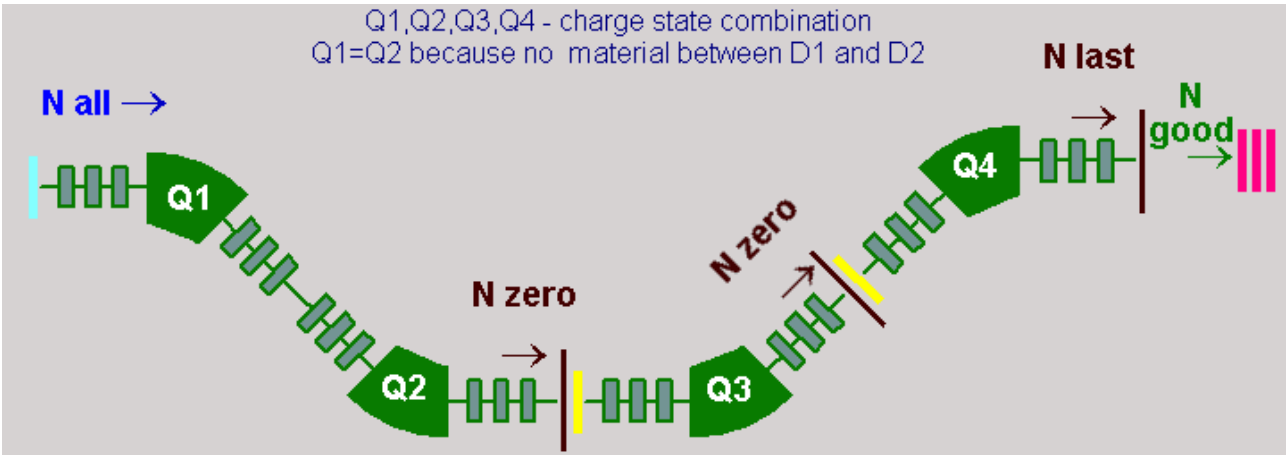
4.4. Optimizations

4.4.1. Optimization of "charge state" transmission calculations

Transmission calculation optimization for the case of charge states through the “Production mechanism” dialog.

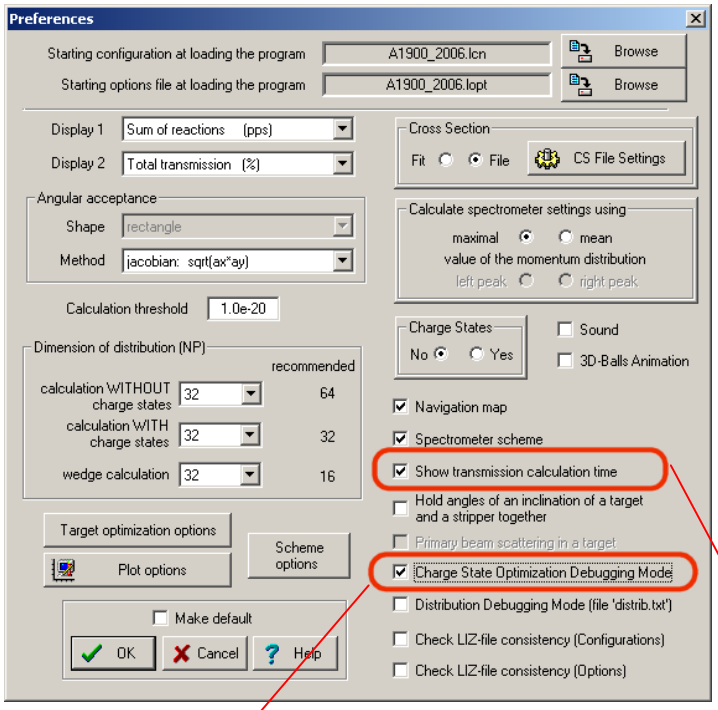


Efficient if there two or more “Material & Dispersive block” combinations



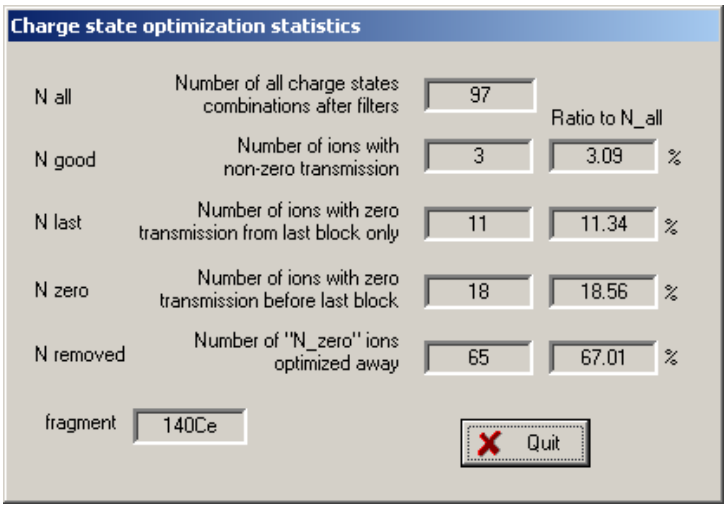
see next page for explanation of Nall, Nzero, Nlast values.

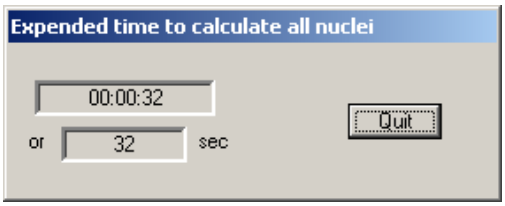
The “Preferences” dialog:



Charge state Optimization Debugging mode

"Show transmission calculation time" option



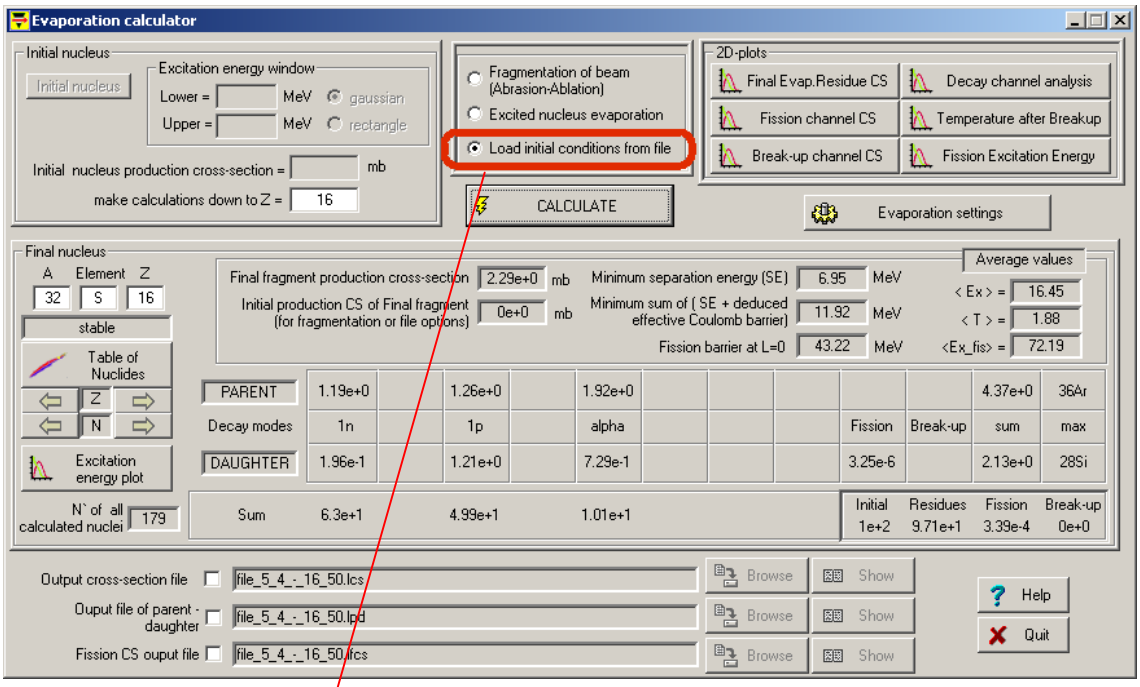


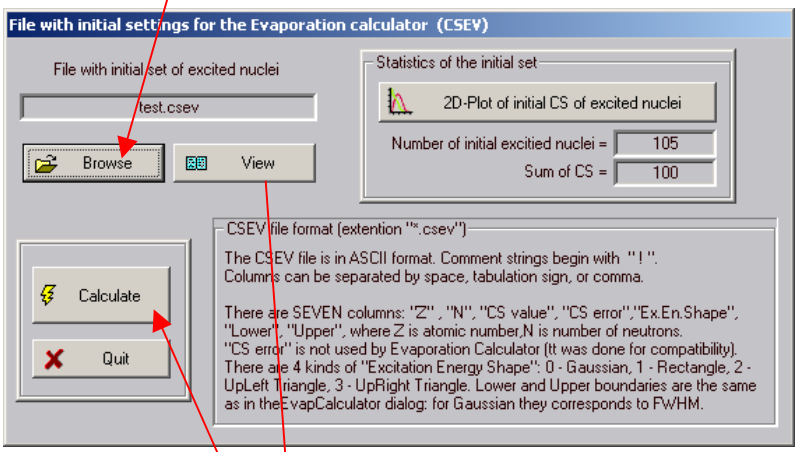
4.4.2. Optimization of transmission calculations for low-rate case

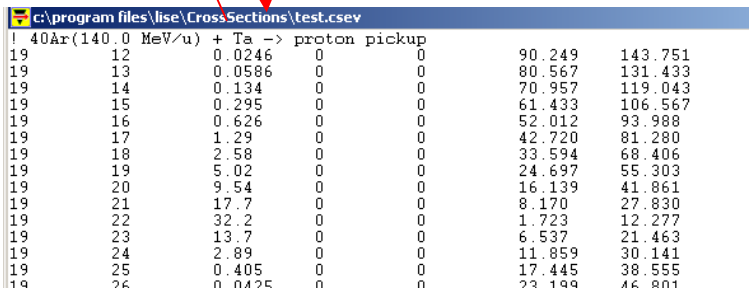
Before calculate fragment transmission the LISE++ code checks fragment rate suggesting 100% transmission. If this value is larger than the threshold (set in the “Preferences” dialog) then the code calculates transmission. If lower, than this fragment will be missed in calculations.

4.5. Other

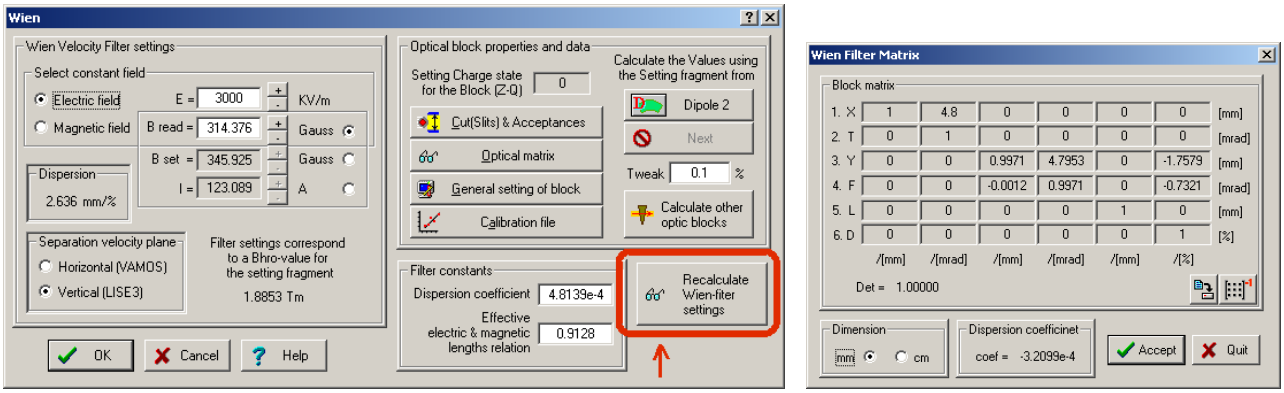
4.5.1. The Evaporation Calculator: Loading initial settings from file







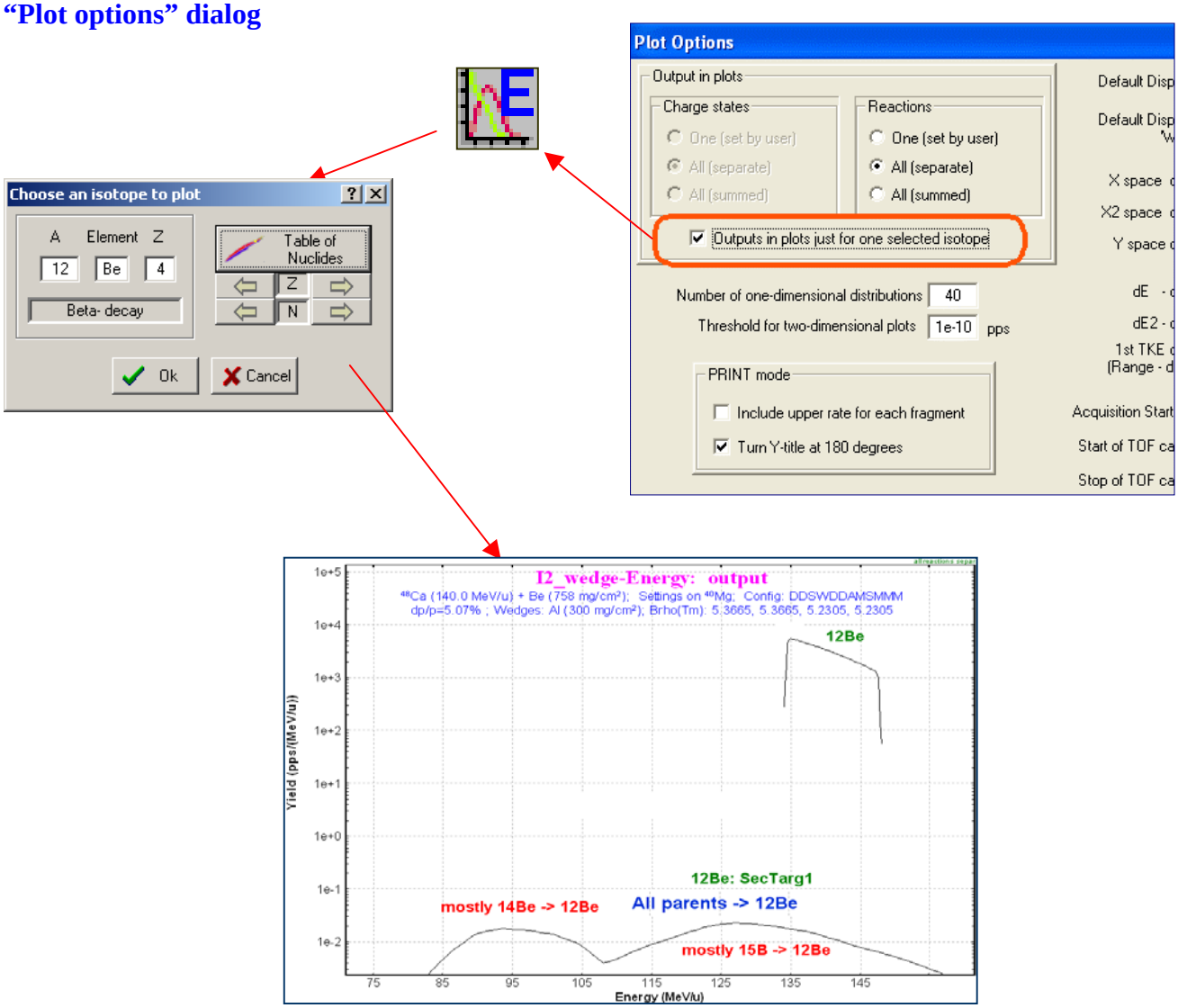
4.5.2. The "Wien filter" block: calculation of dispersion coefficient and optic matrix



4.5.3. Outputs in plots just for one selected isotope

It is very useful for the “Fragment production in Material” case

“Plot options” dialog



4.5.4. Configuration files renewal

Set-up	*Laboratory*
BigRIPS	RIKEN
FRS	GSI
LISE3	GANIL

5. Corrections

- Modification of Gamma registration results output
- Correction in the subroutine of value entry in the Kinematics dialog
- Correction of the "Gas-filled separator" block
- Correction in the "Gas pressure optimization" utility
- Correction in the distribution convolution subroutines
- Some corrections were done for the case of large momentum acceptance and thick wedge
- Width of Momentum distribution for isobars of the projectile