LISE++ (ver. 8.1)

Version	Date	Problem
8.0.42	27.11.07	Modification of the Angular acceptance subroutine for the fission case
8.0.41	27.11.07	Insignificant modifications in the Reaction Mechanism dialog and the fission potential subroutine
8.0.39	26.11.07	Cutting of X- ,Y- & P-distributions due to angular acceptance
8.0.38	25.11.07	Z vs A-2Q, Z vs A-3Q 2D-plots
8.0.37	22.11.07	Correction for pseudo MC plot connected with wedge thickness defect
8.0.36	06.11.07	GeV/c -> MeV/c substitution for Momentum
8.0.35	29.10.07	No Cross sections from file for reactions in stripper Brho-calculation correction for the target+stripper combination The "Charge states" plot modification
8.0.32	05.10.07	Corrections for G.Schiwietz's charge state model
8.0.31	04.10.07	The "GLOBAL" program: changed output format from ".4f" to "9e3" in order to show low-probability cases
8.0.30	01.10.07	SuperFRS (GSI) configuration and example files
8.0.29	20.09.07	Energy deposition in materials for MC
8.0.28	18.09.07	Correction for Moyal straggling in the MC case Correction of Statistics calculation in the contour in the MC case
8.0.26	11.09.07	Corrections for the case of transmission: charge state & secondary reactions
8.0.25	09.09.07	G.Schiwietz's charge state model in LISE.xls
8.0.24	08.09.07	Corrections for charge state calculation in the Monte Carlo mode
8.0.23	28.08.07	Straggling shape: Moyal function for the Landau distribution The "production mechanism" dialog
8.0.22	27.08.07	Several insignificant modifications
8.0.21	26.08.07	New charge state model in the code: "5 - [< 15AMeV] G.Schiwietz, P.Grande, NIM B175 (2001) 125-131"
8.0.20	17.08.07	MC transmission new parameters: RANGE

Version	Date	Problem
8.0.19	14.08.07	MC transmission new parameters: R = sign(X) sqrt(X^2 + Y^2) A = sign(X') atan(|Velocity(XY)| / Velocity(Z))
8.0.18	09.08.07	Corrections: Combination of consecutive transmission product calculation for several reactions
8.0.17	04.08.07	Corrections: * Transmission analysis dialog * Analytical transmission: initial emittance * MC transmission for TB and Fission reactions
8.0.16	03.08.07	Elliptical collimator mode is available for slit shape in MC calculations
8.0.15	03.08.07	Possibility to use neutron as conjugate fragment for Two body reactions
8.0.14	03.08.07	Two body kinematics available for MC calculations
8.0.13	02.08.07	New reaction mechanism: Two body reaction
8.0.12	01.08.07	New option to draw new MC calculations in the previous MC calculations plot
8.0.11	01.08.07	Charge state calculations have been implemented in MC calculation of transmission as option
8.0.10	31.07.07	Fission reactions are available for MC calculation of transmission
8.0.9	29.07.07	Total revision of MC calculation of transmission. Corrections for the charge state mode
8.0.8	25.07.07	The "Show prefragments" button in the MC transmission dialog in the fission case to run the Fission information window
8.0.7	22.07.07	The "Fission properties" dialog Entry of St.Dev of Excitation Energy value. Using this value for kinematics in both cases: Distribution and MC methods
8.0.6	19.07.07	Monte Carlo plot* revision * - distribution method of transmission calculation
8.0.5	13.07.07	Revision of fusion-fission and fusion-residual excitation function plot. New option: Excitation function file
8.0.4	10.07.07	Corrections for thick target in the fission case

LISE++ (ver. 8.1.1) revision

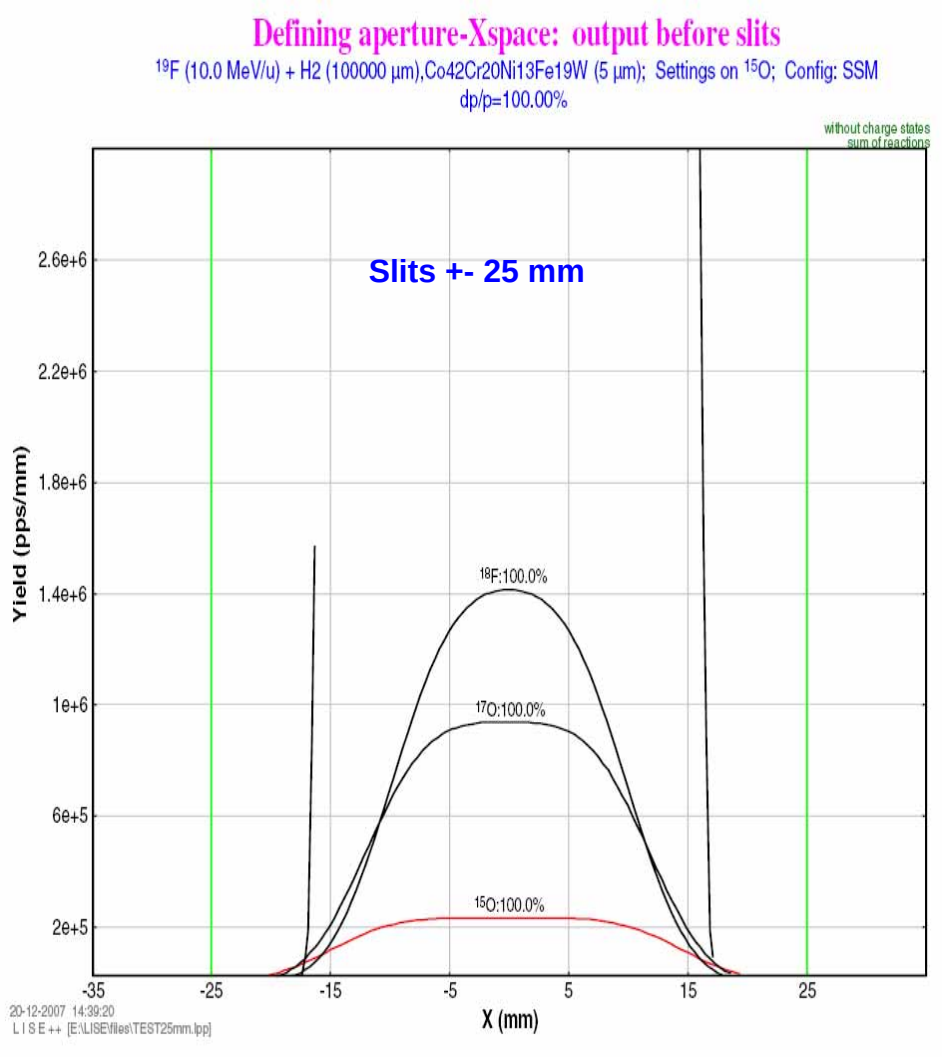
Version	Date	Complaint	Problem	Recon-struction level (1-5)	Correlation*	Necessity (correction, development) (1-5)
8.2.13	11.02.2008	LISE	Revision of rate normalization for pseudo MC 2D-plots	**2**	**no**	**2**
8.2.12	06.02.2008	LISE	Revision of Contour statistics for Z vs A/Q pseudo MC 2D-plot	**1**	**no**	**2**
8.2.11	05.02.2008	LISE	LISE.xls: new sheet "CalculationReaction"	**1**	**no**	**2**
8.2.10	04.02.2008	LISE	Corrections for the "Z vs. A/Q" pseudo_MC plot : *edge effect (TOF zero)*	**2**	**no**	**3**
8.2.9	25.01.2008	Oscar Capurro	Revision of Solid angle window in the Kinematics calculator	**1**	**no**	**2**
8.2.8	24.01.2008	Thomas Baumann	Physical Calculator: Correction for the case "beam + zero thickness target" : edge effect + special case	**3**	**yes**	**5**
8.2.7	18.01.2008	Helmut Weick	MC transmission. Corrections for the Brho-value for charge states: *bug*	**3**	**no**	**4**
8.2.6	17.01.2008	LISE	Correction for the Q_{gg}-plot (2D-case)	**2**	**no**	**2**
8.2.5	16.01.2008	LISE	Implementation of the MOTER code to the LISE++ package	**1**	**no**	**1**
8.2.4	15.01.2008	LISE	Potential energy plot for fusion reaction: correction	**2**	**no**	**3**
8.2.3	09.01.2008	Helmut Weick	Fragment production in material (FPiM): angular distributions : *bug*	**4**	**no**	**4**
8.2.2	09.01.2008	LISE	Monte Carlo Fragment production in material (FPiM): *bug*	**2**	**no**	**4**
8.2.1	24.12.2007	Leah Broussard	Correction in fission fragment transmission: edge effect	**5**	**yes**	**5**

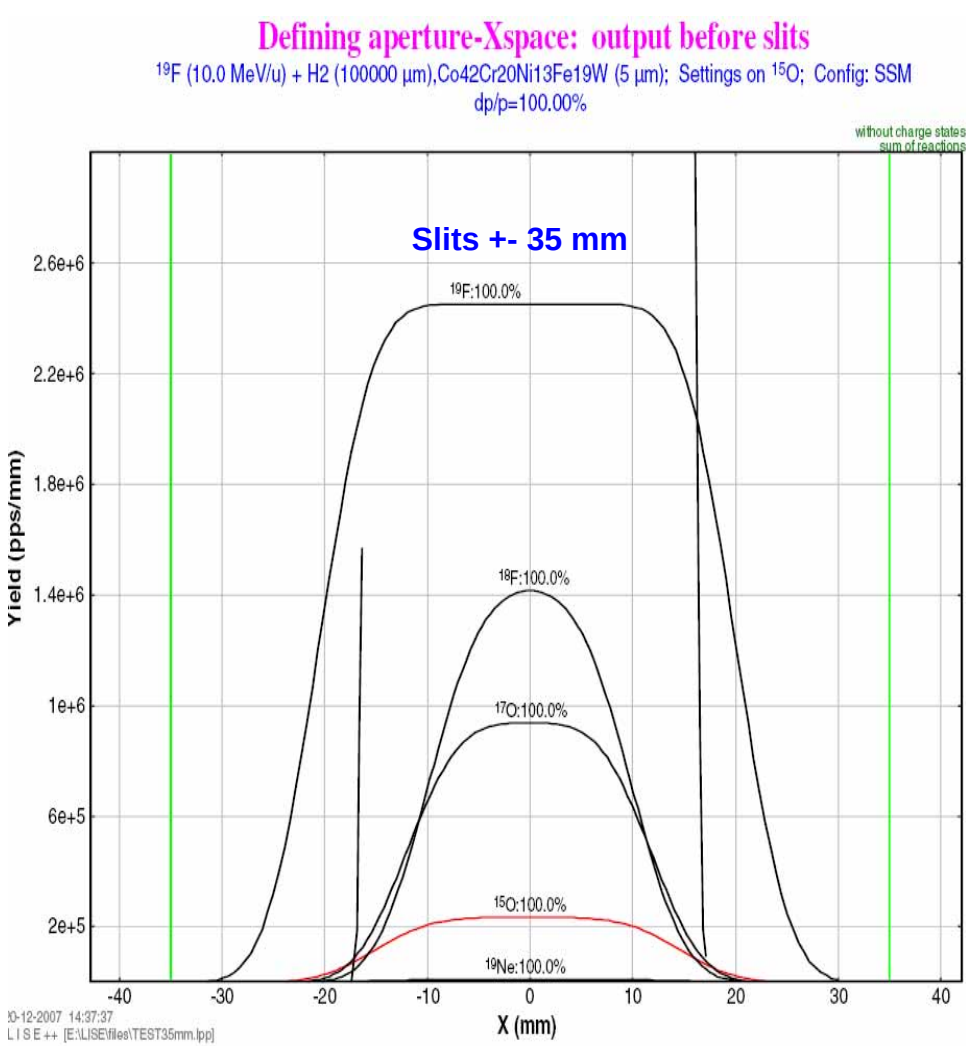
* correlation with transmission analytical calculations

LISE++ (ver. 8.1.2) revision

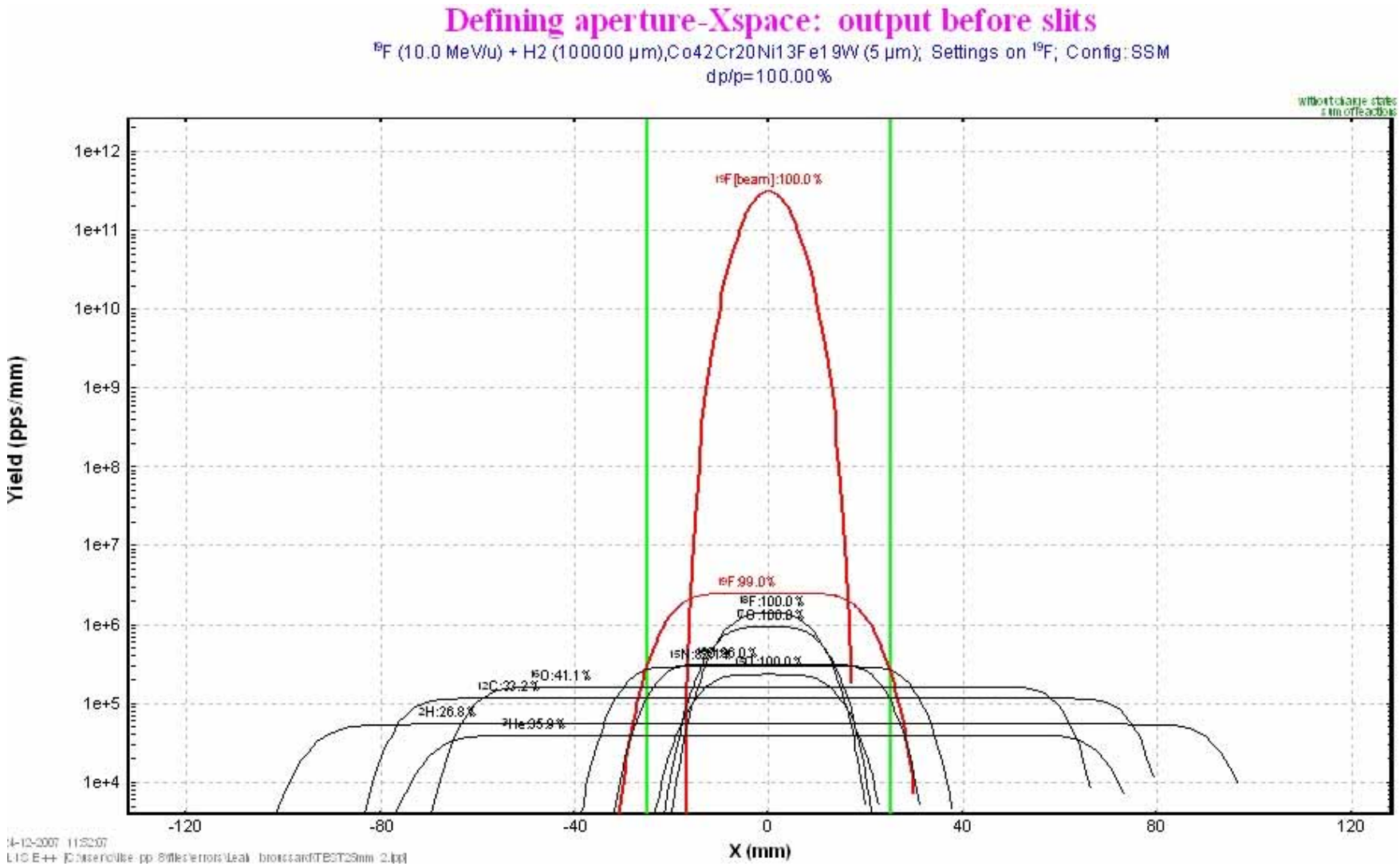
Version	Date	Complaint	Problem
8.2.19	22.02.2008	Brad Sherrill	Correction for the "FPiM & Charge states" combination Thick wedge with charge state option gave a wrong answer with charge state distribution. Crucial bug. Corrected
8.2.18	16.02.2008	LISE	FPiM modifications
8.2.17		LISE	The About dialog has been changed
8.2.16		LISE	Correction: crash for the table of nuclides - unknown isotopes
8.2.15		Marc Hausmann	Secondary reactions: negative thickness value for Optimum target
8.2.14		LISE	No Dubna's server

Problem: No 19F for two-body reaction in the case of cut by slits

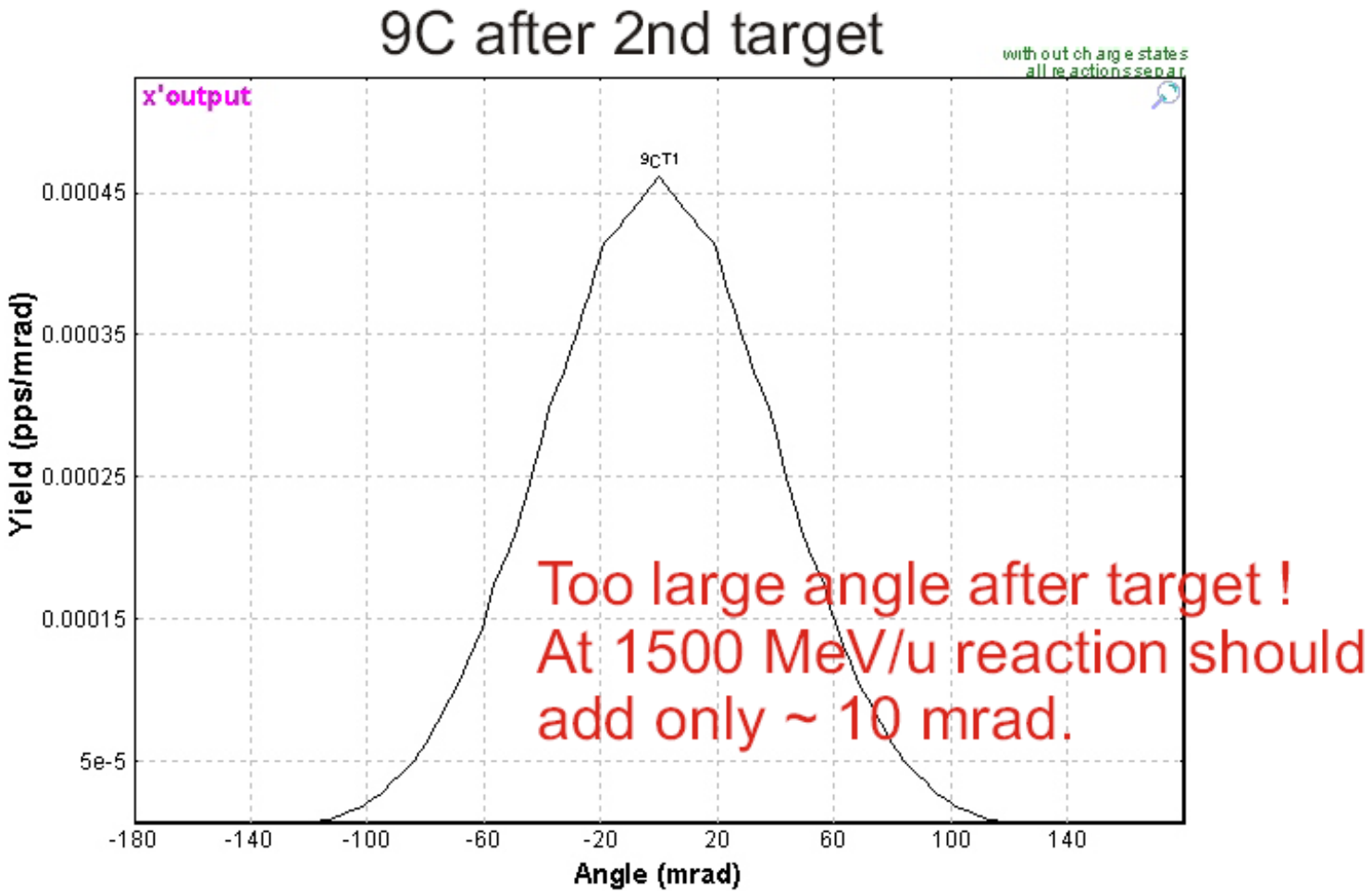




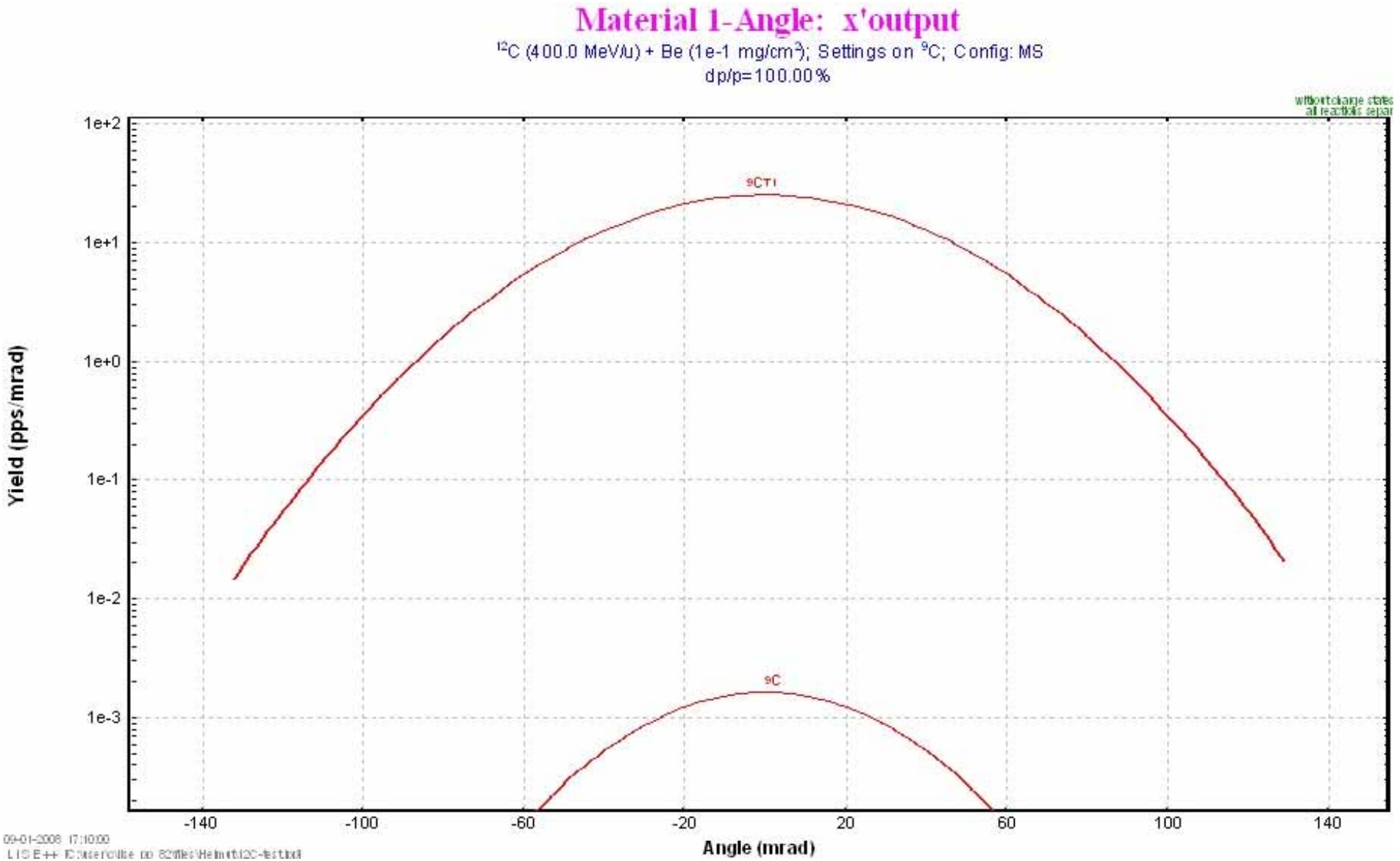
Correction


Defining aperture-Xspace: output before slits
19F (10.0 MeV/u) + H2 (100000 µm),Co42Cr20Ni13Fe19W (5 µm); Settings on 19F; Config: SSM
dp/p=100.00%
Yield (pps/mm)
X (mm)
19F[beam]:100.0%
19F 99.0%
19F:100.0%
18O:41.1%
12C:32.2%
2H:26.8%
3He:35.9%
1e+12
1e+11
1e+10
1e+9
1e+8
1e+7
1e+6
1e+5
1e+4
-120
-80
-40
0
40
80
120

Problem:

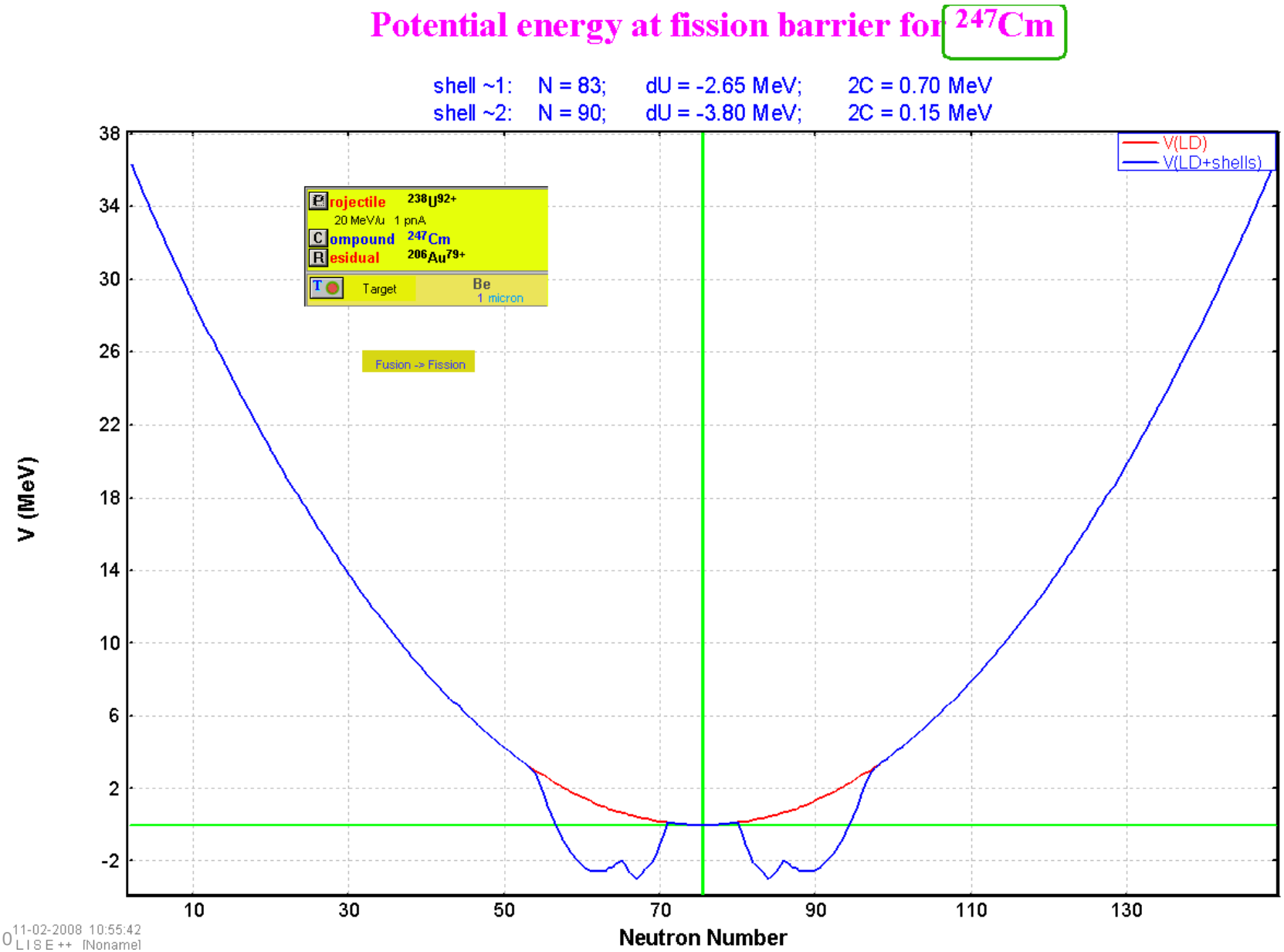

9C after 2nd target
with out charge states
all reactions separ
x'output
9CT1
0.00045
0.00035
0.00025
0.00015
5e-5
Yield (pps/mrad)
-180
-140
-100
-60
-20
20
60
100
140
Angle (mrad)
Too large angle after target !
At 1500 MeV/u reaction should
add only ~ 10 mrad.

Correction

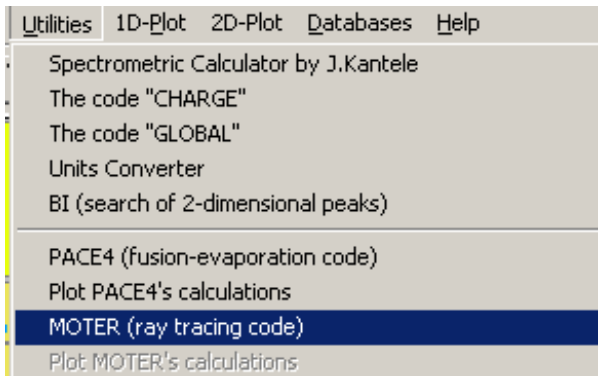

Material 1-Angle: x'output
12C (400.0 MeV/u) + Be (1e-1 mg/cm2); Settings on 9C; Config: MS
dp/p=100.00%
without charge states
all reactions separ
1e+2
1e+1
1e+0
1e-1
1e-2
1e-3
9CT
9C
Yield (pps/mrad)
-140
-100
-60
-20
20
60
100
140
Angle (mrad)
09-01-2008 17:10:00
LISE++

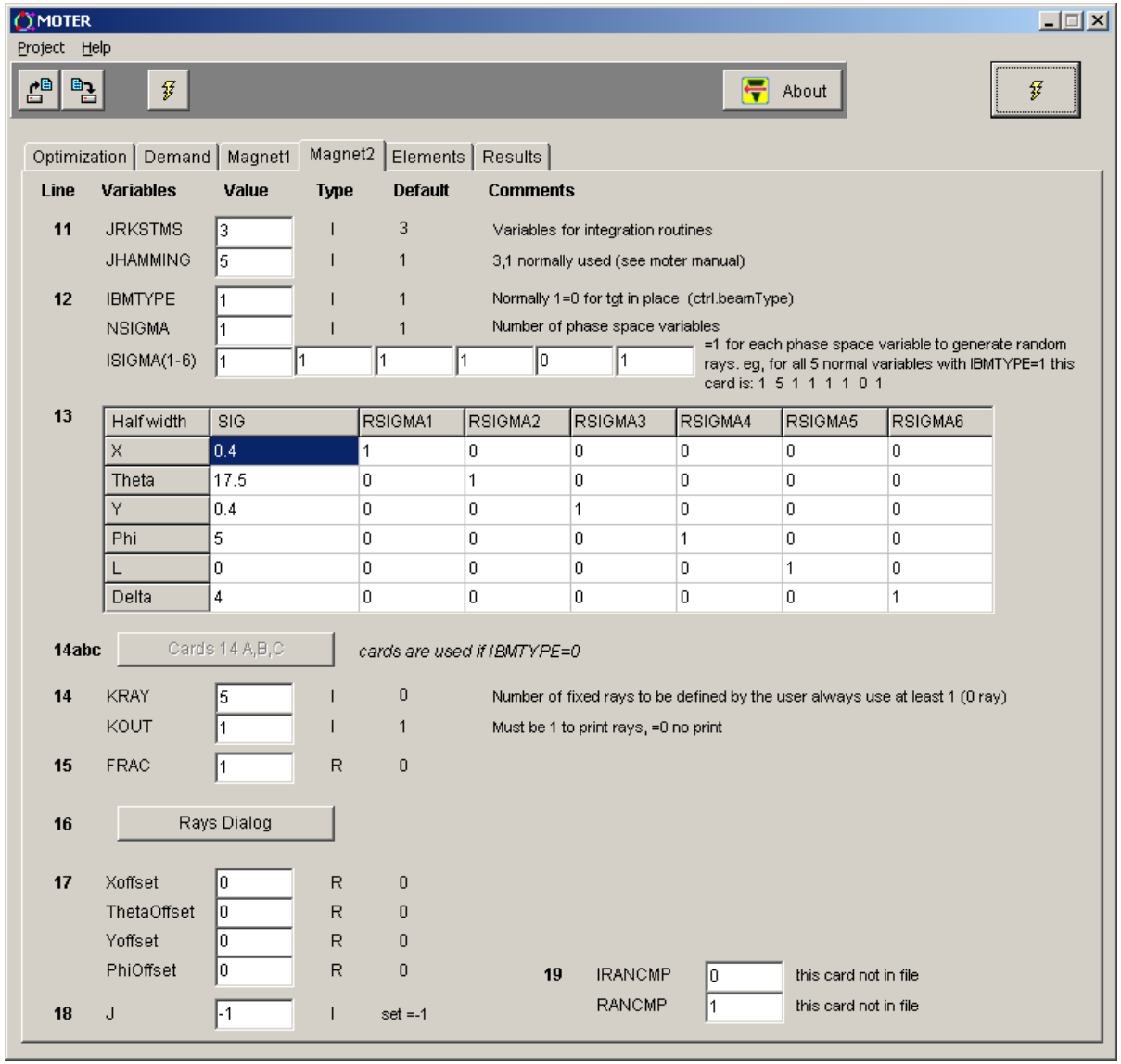
Potential energy plot for fusion reaction: correction

Problem: was only for Abrasion-Fission and Coulomb Fission reactions



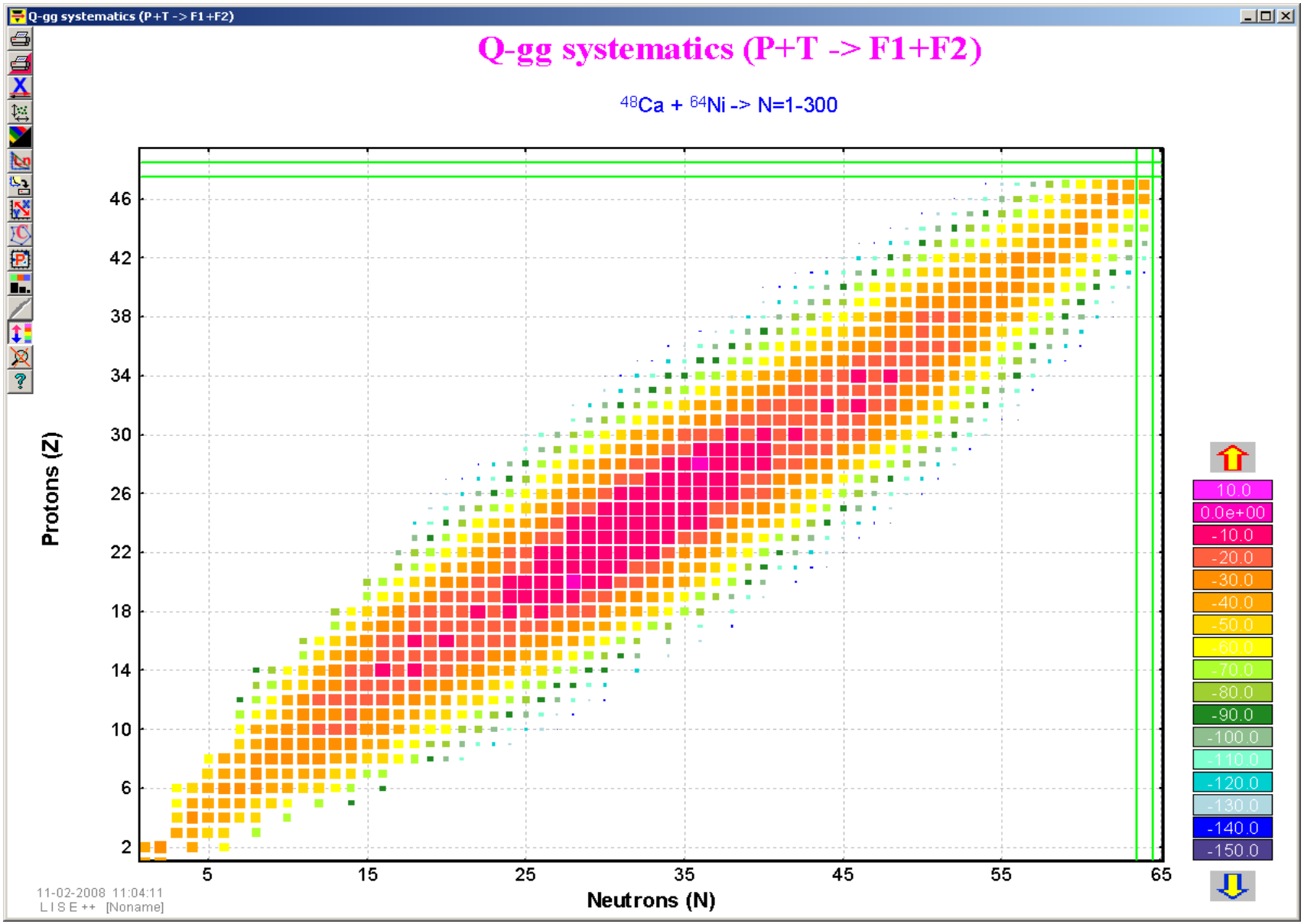
Beta-version



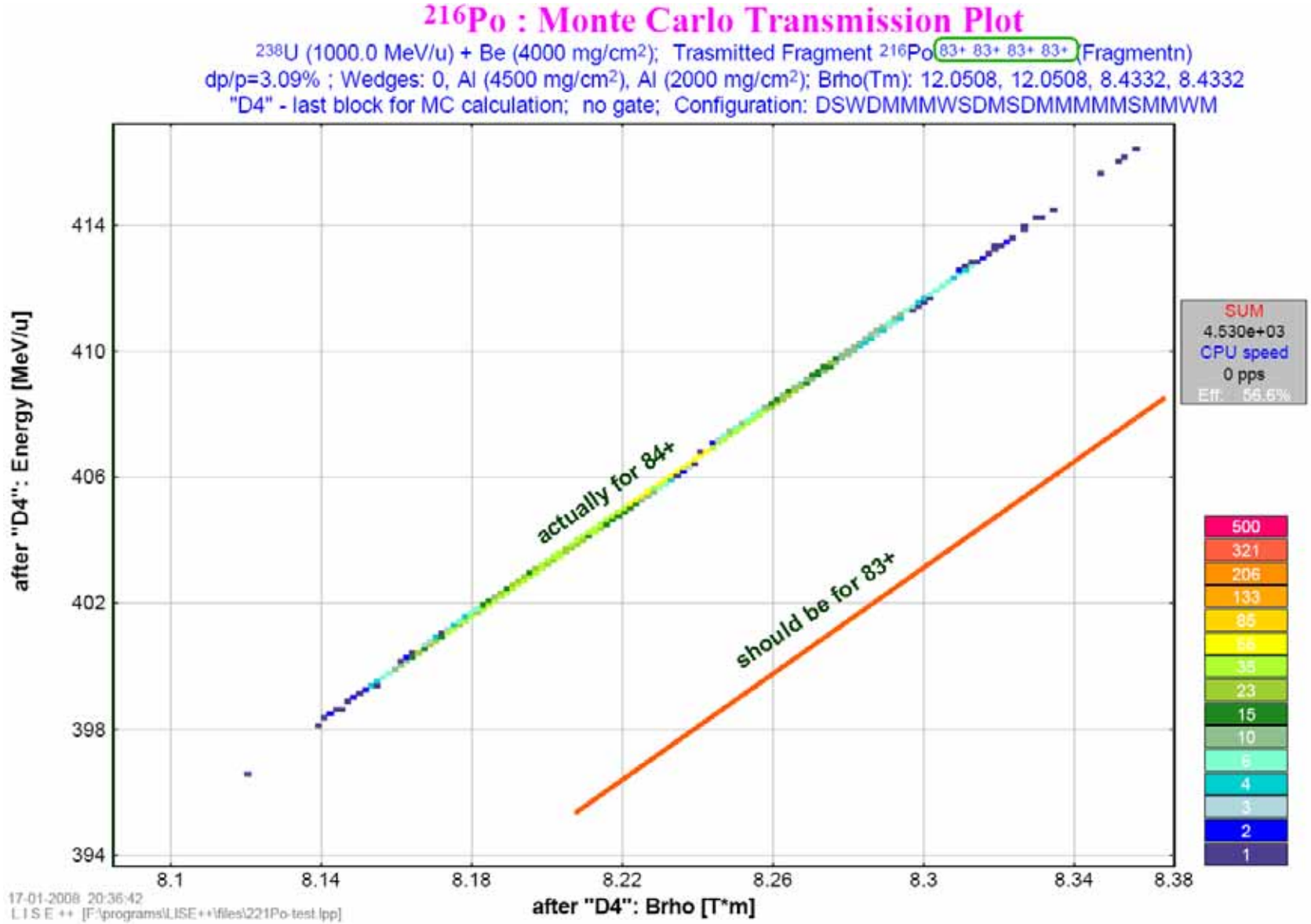


Correction for the Q_{gg}-plot (2D-case)

1D-plot: Ok, and crash for 2D-plot

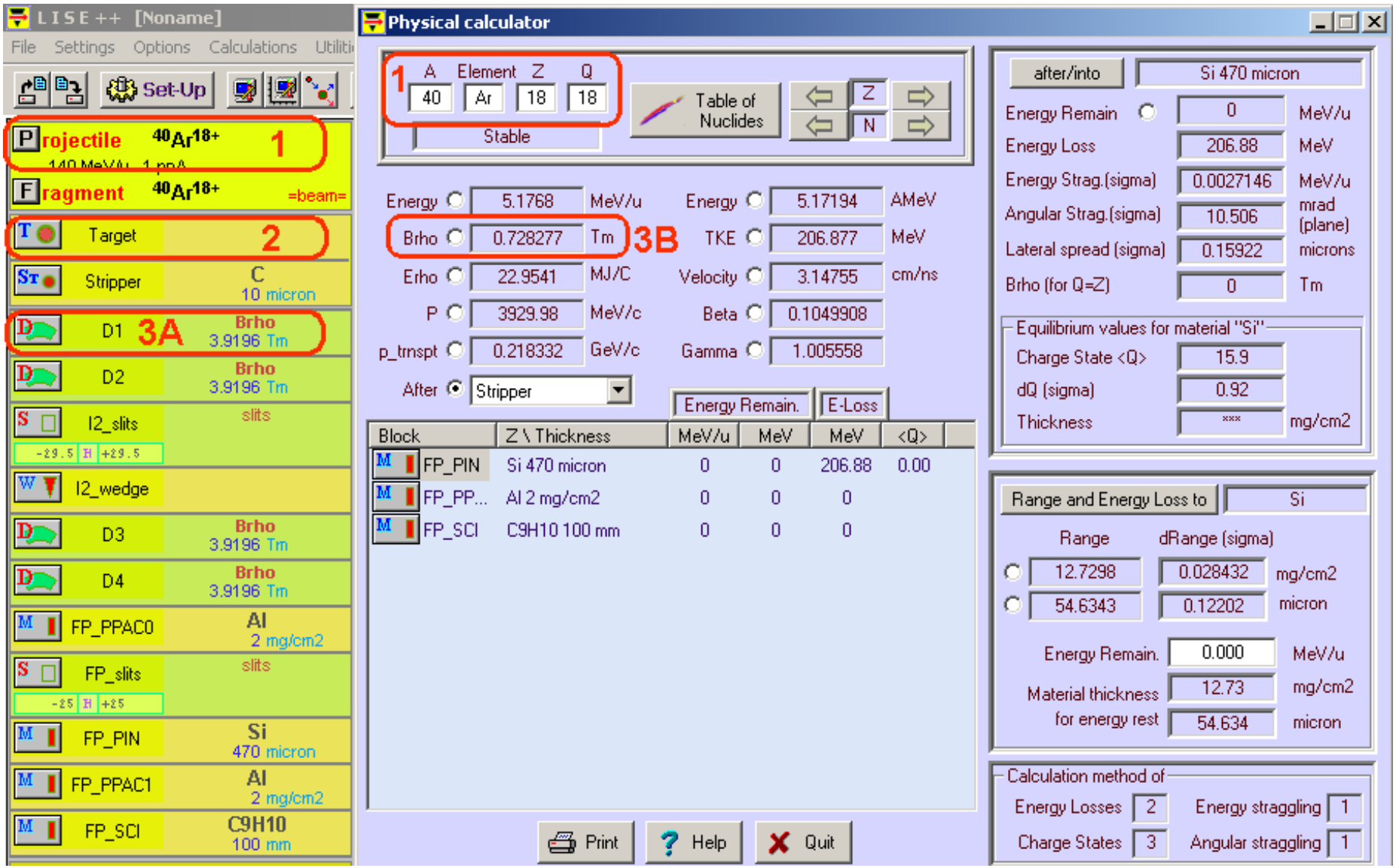


Q=Z was used instead current Q to recalculate Bρ from Energy for plots



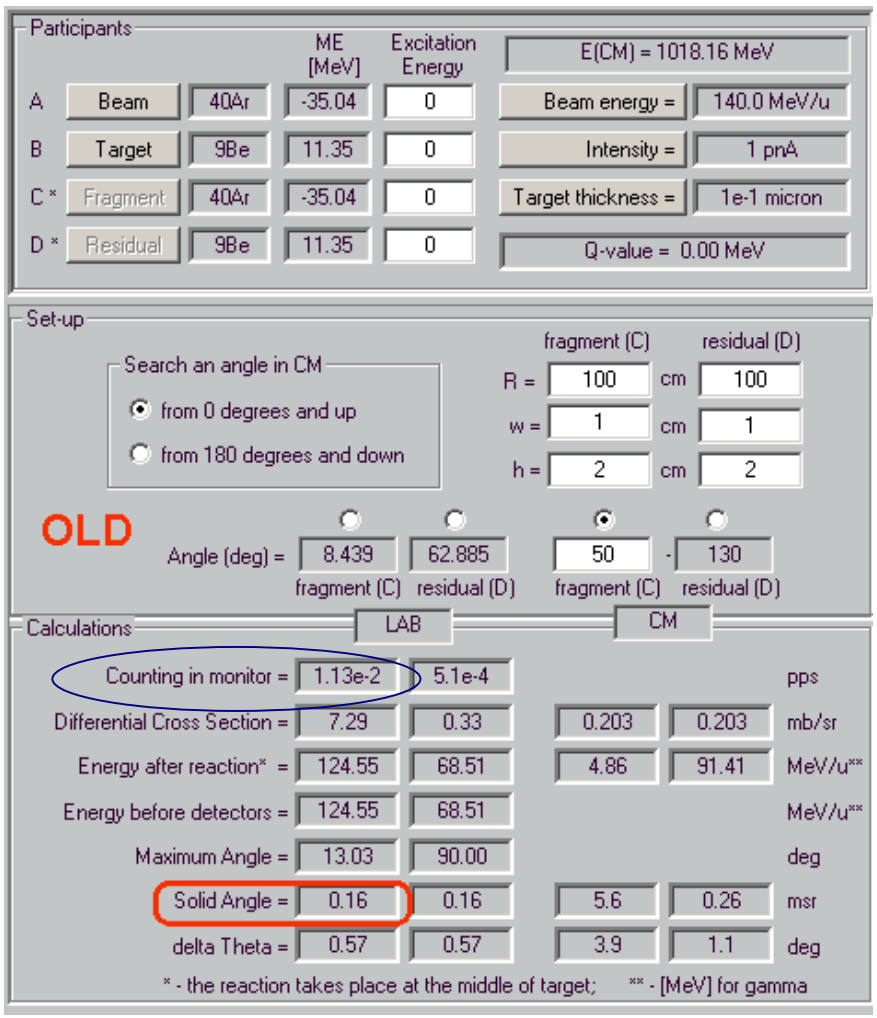
Physical Calculator: Corrections

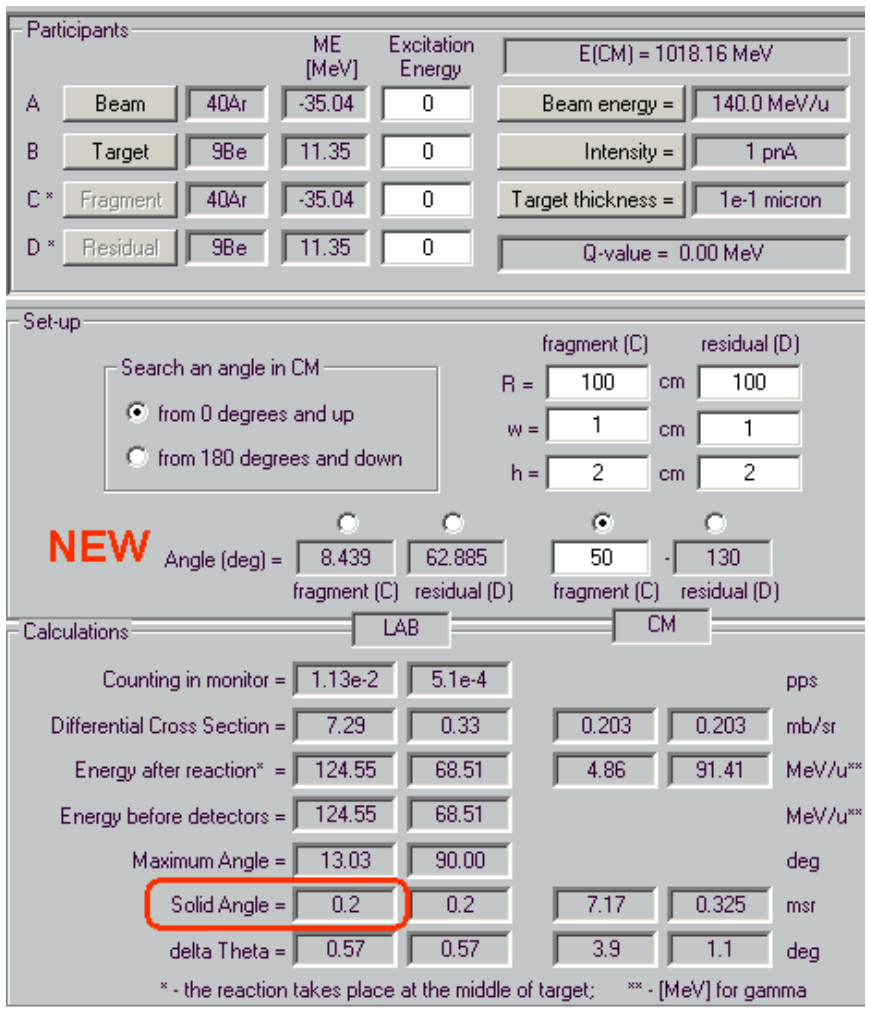
In the case of the primary beam with zero-thickness target



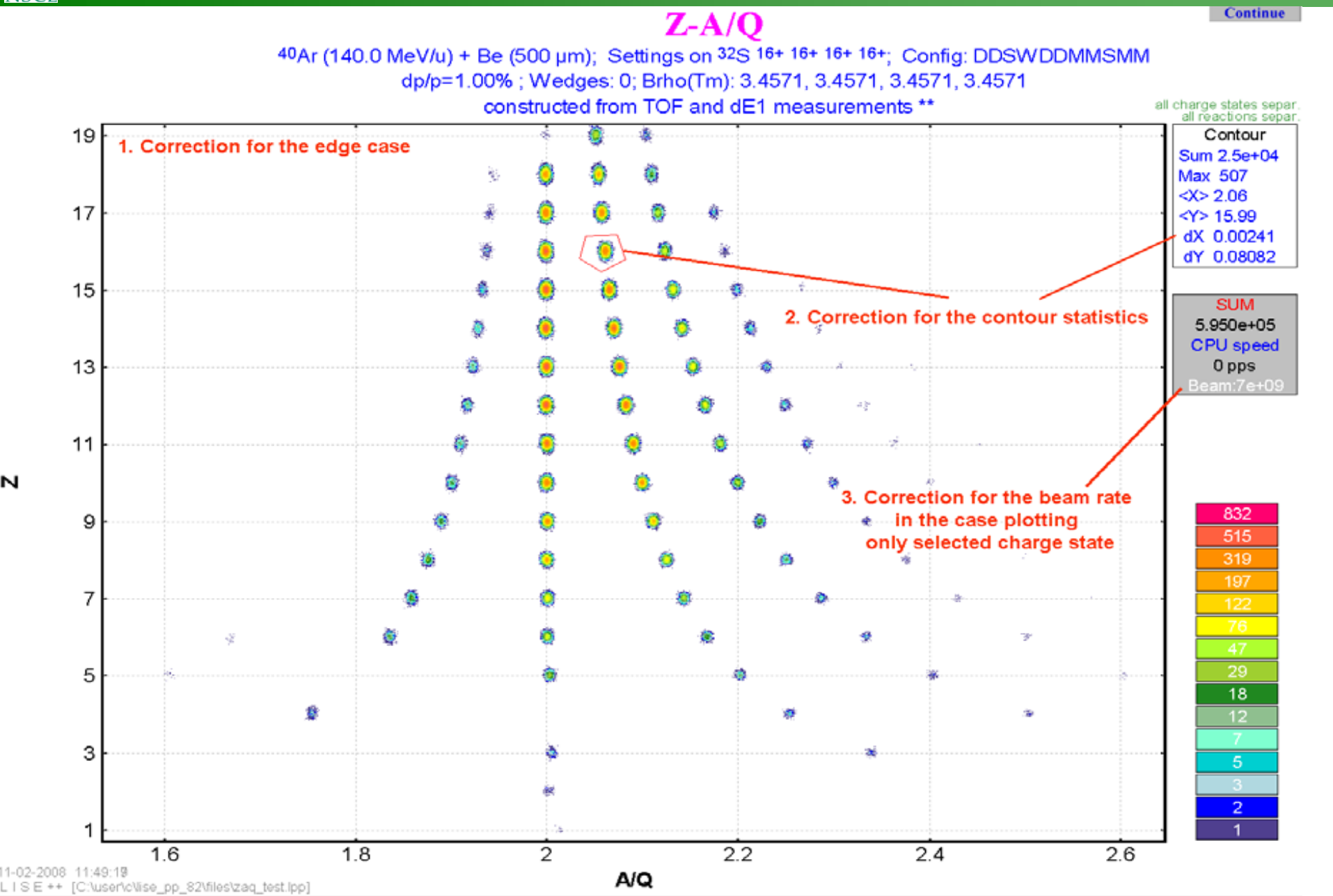
Revision of the Solid angle window in the Kinematics calculator

Solid angle should be 0.2msr instead 0.16 msr shown in the dialog (Area=1x2 cm, distance 100 cm).
An elliptical acceptance pi x H/2 x W/2 = 0.16 was shown in the dialog instead rectangle H x W = 0.2.
The LISE code used the rectangle acceptance value for calculations in the Kinematics calculator.
LISE++ calculations were correct for counting in monitor.





Revision of Z vs A/Q pseudo MC 2D-plot



LISE.xls: new sheet "Reaction Calculation"

	name	definition		formula	s/	24O+2H	24O+2H	24O+2H	48Ca+9Be	48Ca+9Be	4He+22Ne	4He+22Ne
particle	Ap					24	24	24	48	48	4	4
	Zp					8	8	8	20	20	2	2
	Name_p					O	O	O	Ca	Ca	He	He
	Mp	Mass			amu	24.02	24.02	24.02	47.95	47.95	4.00	4.00
	dEp	MassExcess			MeV	19.070	19.070	19.070	-44.214	-44.214	2.425	2.425
	Ap3	Ap^(1/3)		Ap^(1/3)		2.88	2.88	2.88	3.63	3.63	1.59	1.59
	Rp	equivalent sharp radius(calc)	Wilcke	1.28*Ap3-0.76+0.8/Ap3	fm	3.21	3.21	3.21	4.11	4.11	1.78	1.78
	Rp1	equivalent sharp radius(calc)	Hodgson	(1.13+0.0002*Ap)*Ap3	fm	3.27	3.27	3.27	4.14	4.14	1.80	1.80
	Cp	matter half-density radius(calc)	Wilcke	Rp*(1-(1/Rp)^2)	fm	2.90	2.90	2.90	3.87	3.87	1.21	1.21
	Cp1	matter half-density radius(calc)	Hodgson	Rp1*(1-(1/Rp1)^2)	fm	2.97	2.97	2.97	3.90	3.90	1.24	1.24
	Cp2	matter half-density radius(calc)		1.18*Ap3-0.48	fm	2.92	2.92	2.92	3.81	3.81	1.39	1.39
	Rpcharge	charge radius	Hodgson	1.12*Ap3+2.009/Ap3-1.513/Ap	fm	3.86	3.86	3.86	4.59	4.59	2.67	2.67
target	At					2	2	2	9	9	22	22
	Zt					1	1	1	4	4	10	10
	Name_t					H	H	H	Be	Be	Ne	Ne
	Mt	Mass			amu	2.01	2.01	2.01	9.01	9.01	21.99	21.99
	dEt	MassExcess			MeV	13.14	13.14	13.14	11.35	11.35	-8.02	-8.02
	At3	At^(1/3)		At^(1/3)		1.26	1.26	1.26	2.08	2.08	2.80	2.80
	Rt	equivalent sharp radius(calc)	Wilcke	1.28*At3-0.76+0.8/At3	fm	1.49	1.49	1.49	2.29	2.29	3.11	3.11
	Rt1	equivalent sharp radius(calc)	Hodgson	(1.13+0.0002*At)*At3	fm	1.42	1.42	1.42	2.35	2.35	3.18	3.18
	Ct	matter half-density radius(calc)	Wilcke	Rt*(1-(1/Rt)^2)	fm	0.82	0.82	0.82	1.85	1.85	2.79	2.79
	Ct1	matter half-density radius(calc)	Hodgson	Rt1*(1-(1/Rt1)^2)	fm	0.72	0.72	0.72	1.93	1.93	2.86	2.86
	Ct2	matter half-density radius(calc)		1.18*At3-0.48	fm	1.01	1.01	1.01	1.97	1.97	2.83	2.83
	Rtcharge	charge radius	Hodgson	1.12*At3+2.009/At3-1.513/At	fm	2.25	2.25	2.25	3.13	3.13	3.79	3.79
constant	Ac			Ap+At		26	26	26	57	57	26	26
	Zc			Zp+Zt		9	9	9	24	24	12	12
	Name_t					F	F	F	Cr	Cr	Mg	Mg
	Mc	Mass			amu	26.02	26.02	26.02	56.94	56.94	25.98	25.98
	dEc	MassExcess			MeV	18.27	18.27	18.27	-52.52	-52.52	-16.22	-16.22
	Q	ground state Q-value for fusion		dEt+dEp-dEcomp	MeV	13.94	13.94	13.94	19.66	19.66	10.62	10.62
	m	reduced mass number		Ap*At/(Ap+At)		1.85	1.85	1.85	7.58	7.58	3.38	3.38
	Ac3	Ac^(1/3)		Ac^(1/3)		2.96	2.96	2.96	3.85	3.85	2.96	2.96
	AtAp3	At^(1/3)+Ap^(1/3)		At3+Ap3		4.14	4.14	4.14	5.71	5.71	4.39	4.39
	RtRp	sum Rt and Rp		Rt+Rp	fm	4.70	4.70	4.70	6.40	6.40	4.89	4.89
	Rint	interaction radius	Wilcke	Ct+Cp+4.49-(Ct+Cp)/6.35	fm	7.62	7.62	7.62	9.31	9.31	7.86	7.86
	Rin1	interaction radius	Hodgson	1.68*AtAp	fm	6.96	6.96	6.96	9.60	9.60	7.37	7.37
	Rin2	interaction radius	Hodgson	Cp1+Ct1+3.2	fm	6.89	6.89	6.89	9.03	9.03	7.30	7.30
	Rbarrier	fusion barrier radius for s-wav.	Wilcke	Rint-0.3117*(Zp*Zt)^(0.2122)	fm	7.13	7.13	7.13	8.52	8.52	7.27	7.27
	Rc	coulomb radius from "LNP"	LNP	0.5+1.36*AtAp3	fm	6.14	6.14	6.14	8.27	8.27	6.47	6.47
	Ro			Rint/(At^(1/3)+Ap^(1/3))	fm	1.84	1.84	1.84	1.63	1.63	1.79	1.79
	<C>	reduced half-density radius		Ct*Cp/(Ct+Cp)	fm	0.64	0.64	0.64	1.25	1.25	0.85	0.85
	VC	BSS Coulomb pot. at r=Rint		1.438*Zp*Zt/Rint	MeV	1.51	1.51	1.51	12.36	12.36	3.66	3.66
	VC_Rc	BSS Coulomb pot. at r=Rc		1.438*Zp*Zt/Rc	MeV	1.87	1.87	1.87	13.91	13.91	4.45	4.45
	VC_Rbar	total conserv. potential at Rbar		1.438*Zp*Zt/Rbar	MeV	1.61	1.61	1.61	13.51	13.51	3.95	3.95
	Xf	Saddle point (fissility parameter)		Z^2/A/50.13(1-7.826(N-Z)^2/A^2		0.05	0.05	0.05	0.19	0.19	0.11	0.11
	TKE	fission TKE for simmet. fission		0.1071*Zc^2/Ac3+22.3	MeV	25.23	25.23	25.23	38.33	38.33	27.51	27.51
function(E)	Elab				MeV	120.1	240.2	480.4	959.1	1438.6	20.0	40.0
	Elab / Mp	Energy per nucleon		Elab / Ap	MeV/u	**5.00**	**10.00**	**20.00**	**20.00**	**30.00**	**5.00**	**10.00**
	Ecm	Energy SCM		Mt*Elab/ (Mt+Mp)	MeV	9.3	18.6	37.2	151.7	227.6	16.9	33.9
	Ecm+Q	Excitation Energy		Ecm+Q	MeV	23.2	32.5	51.1	171.4	247.2	27.5	44.5
	ETA	coulomb parameter	Wilcke	Zp*Zt*e*e/h/v		0.6	0.4	0.3	2.8	2.3	1.4	1.0
	k	asym. wave number in the CMS	Wilcke	(2*mu*m_nucion*Ecm/h/h)^(1/2)	1 / fm	0.9	1.3	1.8	7.4	9.1	1.7	2.3
	a	parameter	Wilcke-Hod	Zt*Zp*e*e/(mv^2) --- ETA/k	fm	0.6	0.3	0.2	0.4	0.3	0.9	0.4
	QP-CM	quarterpoint angle in the CMS	Wilcke	2*arcsin(ETA/(k*Rint-ETA))	deg	10.2	4.9	2.4	4.9	3.2	13.9	6.6
	Qgr	grazing angle in the CMS(LNF)	LNF	2*ATAN(ETA / Lmax)	deg	10.2	4.9	2.4	4.9	3.2	13.9	6.6
	Qcr	critical angle		2*asin(a/(Rint-a)	deg	10.2	4.9	2.4	4.9	3.2	13.9	6.6
	LcriticalF	crit.ang.momentum for fusion		k*RtRp*(1-2a/RtRp)^0.5-0.5	M3pi	3	5	8	44	55	6	10
	Lmax	graz.ang.momentum by QP-CM	Wilcke	ETA*cot(QP-CM/2)	M3pi	6	9	14	66	82	12	17
	SGMAR	reaction CS derived from Lmax		(pi/k^2)*(Lmax+1/2)^2	mb	1777	1858	1881	2538	2605	1657	1833
	SGcr	critical CS		pi()/k/k*(Lcr+0.5)^2	mb	510	602	647	1134	1185	489	620
	SGMgr1	grazing CS		pi()*Rc^2*(1-VC_RC/Ecm)	mb	944	1064	1123	1952	2018	970	1142
	SGMgr2	grazing CS		pi()*Rint^2*(1-VC/Ecm)	mb	1527	1675	1749	2500	2574	1523	1733
	Dgr	dist.of cl.appr. in the graz.angle		a*(1+cosec((QP-CM/2))	fm	4.1	4.0	3.9	4.8	4.8	4.4	4.2
	Dgr/AtAp3	ratio Dgr to AtAp3		Dgr/AtAp3	fm	1.0	1.0	0.9	0.8	0.8	1.0	0.9
	WaveLength			197/sqrt(2*Ap*931*Elab)	fm	0.09	0.06	0.04	0.02	0.02	0.51	0.36
	AngDif1			2*asin(pi()*WaveLength/2/Rt)	degrees	10.30	7.28	5.15	1.67	1.37	29.85	20.99
	AngDif2			2*asin(pi()*WaveLength/Rt)	degrees	20.69	14.59	10.30	3.35	2.73	62.01	42.72
	bgr	impact parameter for graz.		a*cos(1/2*Qgr)	fm	0.6	0.3	0.2	0.4	0.3	0.8	0.4

Base | Global | ChargeStates -> MeanValue | **ReactionCalculation** | Z -> data | data -> Z | parameters