

New Transmission option: "CENTRAL CUT"



v.16.13.1 03/26/23

"CENTRAL distribution" : local name for IMAGEs as Cible.DF (class "distribution4")

Old problem: low contamination, new Marc's request

Preferences			×	
- Starting files and working directories		c (Options dialogs	
Starting configuration A1900	_2019.lcn	Browse	Font size	
Starting options file FRIB_1	2023.lopt	Browse	Scheme options	
- Working directory			Window satellites locations	
Current user has Yes	LISE** working directory	User My Documents	Target optimization options	
	(options, config, etc) is:	LISE++ root directory	Plot options	
Calculation settings Calculation threshold 1.0e-10 pps	Calculate spectrometer settings us maximal O • mear	n Apply "Edge" Yes (default)	effect in "Distribution" cuts No (recommended for extended config)	New Transmission option: "CENTRAL CUT"
Dimension of distribution (NP)	value of the momentum distr	ibution "Cut" correctio	ns for "Central" distributions —	
calculation WITHOUT 64 64	left peak 🔘 🔹 right	peak O no (v<16.13	3) O moderate	"strong" is Default
calculation WITH 32 32	Charge States	Cross Section		etterig te Deradit
wedge 64 32	No 💿 Yes	Fit 🔾 🖲	File CS File Settings	
Transmission information in Nuclide Table	Utility options	Expert options	Debug options	
Display 1 Total: All reactions (pps)	✓ Navigation map	Show Fitting constraint ✓ blocks in the Setup and Scheme windows	Show transmission calculation time	
	Spectrometer scheme	Use angular straggling		
Display 2 TI transmission no SR (%)	✓ Allow drift blocks hiding	contribution in optical matrices (use only at low energies!)	Charge State Optimization Debugging Mode	
	Balls animation	Primary beam scattering	Distribution Debugging	
Make default	Show laboratory logos	in target (MC)	Wode (nie distributi)	
🗸 OK 🗙 Cancel 📍 Help	Sound	Show Abrasion-Ablation in x-section plots	of a target and a stripper together	

Oleg Tarasov @ MSU 03/26/2023

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Sketch: passing slits in LISE⁺⁺ and next distribution cuts

Cu ₩ MICHIGAN STATE UNIVERSITY



• 5 images + 1 sigma (total 6) distributions are convoluted to obtain the final distribution to pass slits

- Cut of a Distribution after slits is obtained with the convolution of other 5 distributions and inverse slit distribution
- In the case of <u>large accumulated uncertainties</u> (thickness defect, straggling and so on), it looks like image ("central") distributions are not cut correctly











Yield (a.u.)

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Set Option "No", then calculate ⁸⁹Tc

Menu \rightarrow 1D-Plot \rightarrow Debug Information

Block name	sPd(MeVc)	sPu(MeVc)	sX(mm)	sY(mm)	P-min	P-max	 x-min	x-max	y-min	y-max	a-min	a-max	b-min	 b-max	 d)
				I								l			
Stripper	0.00	0.00	0.30	0.30	49957	58887	-0.0	0.0	-0.0	0.0	-0.0	0.0	-0.0	0.0	+7.2
shield	0.00	0.00	6.36	6.36	50097	58747	-0.0	0.0	-0.0	0.0	-0.0	0.0	-0.0	0.0	+1.1
RAm90	0.00	0.00	6.36	6.36	50097	58747	-0.0	0.0	-0.0	0.0	-0.0	0.0	-0.0	0.0	+1.1
PS1A	0.00	0.00	2.06	25.21	50097	58747	-66.5	81.1	-0.0	0.0	-37.3	45.5	-0.0	0.0	+1.7
Beam Dump	0.00	0.00	2.06	25.21	50097	58747	-66.5	81.1	-0.0	0.0	-37.3	45.5	-0.0	0.0	+1.7
Frag Catchers	0.00	0.00	2.06	25.21	50097	58747	-66.5	81.1	-0.0	0.0	-37.3	45.5	-0.0	0.0	+1.7
PS1B	0.00	0.00	0.41	0.37	50097	58747	-225.4	184.8	-0.0	0.0	-0.0	0.0	-0.0	0.0	-4.7
PS_I_slits	0.00	0.00	0.41	0.37	51745	56243	-106.7	106.7	-0.0	0.0	-0.0	0.0	-0.0	0.0	-4.7
PS_wdg	122.82	122.23	0.41	0.37	46416	47644	-106.7	106.7	-0.0	0.0	-0.0	0.0	-0.0	0.0	-1.7
PS1C	122.82	122.23	28.81	7.59	46416	47644	-81.1	99.8	-0.0	0.0	-10.3	11.4	-0.0	0.0	+1.5
PS1D	122.81	122.22	0.49	0.45	46416	47644	-28.9	-12.4	-0.0	0.0	-8.5	-3.7	-0.0	0.0	+1.3
PS_FP_slit	25.61	25.48	0.49	0.45	46416	47644	-28.9	-12.4	-0.0	0.0	-8.5	-3.7	-0.0	0.0	+1.3
RA90	25.61	25.48	0.45	0.49	46416	47644	-0.0	0.0	-28.9	-12.4	-0.0	0.0	-8.5	-3.7	-4.6
C_D1	25.51	25.38	0.63	0.69	46416	47644	-32.7	27.1	18.1	42.3	-0.0	0.0	-24.8	-10.6	+4.9
DB2 slits	25.51	25.38	0.63	0.69	46416	47644	-32.7	27.1	18.1	42.3	-0.0	0.0	-24.8	-10.6	+4.9
DB2 Wedge	25.51	25.38	0.63	0.69	46416	47644	-32.7	27.1	18.1	42.3	-0.0	0.0	-24.8	-10.6	+4.9
C_D2	25.49	25.37	0.37	0.70	46416	47644	-0.0	0.0	-44.9	-19.3	-0.0	0.0	19.3	45.2	-3.5
FS_F2S2:SLH_D	25.49	25.37	0.37	0.70	46416	47644	-0.0	0.0	-44.9	-19.3	-0.0	0.0	19.3	45.2	-3.5
C_D3	25.39	25.27	0.62	0.61	46416	47644	-31.3	28.5	17.1	39.9	-0.1	0.1	-72.1	-30.8	+4.9
C_D4	25.39	25.27	1.51	8.08	46416	47644	0.0	0.0	-208.5	-89.3	-0.0	0.0	7.1	16.5	-9.4
FS_F3S2:PM_D1	25.42	25.30	1.51	8.08	46402	47630	0.0	0.0	-208.5	-89.3	-0.0	0.0	7.1	16.5	-9.4
FS_F3S2:PM_D1	25.45	25.33	1.51	8.08	46387	47616	0.0	0.0	-208.5	-89.3	-0.0	0.0	7.1	16.5	-9.4
FS_F3S2:SLH/V	7.85	7.81	1.51	7.69	47389	47616	0.0	0.0	-160.5	-89.3	0.0	0.0	7.1	12.7	-5.5

Menu \rightarrow 1D-Plot \rightarrow Debug Plot



 $PS_FP_slit \rightarrow Debug$





Set Option "Moderate", then calculate ⁸⁹Tc

Menu \rightarrow 1D-Plot \rightarrow Debug Information

Menu \rightarrow 1D-Plot \rightarrow Debug Plot



 Block name 	 sPd(MeVc) 	 sPu(MeVc) 	sX(mm)	sY(mm)	P-min	 P-max 	 x-min 	x-max	y-min	y-max	a-min	a-max	b-min	b-max	d۶
Stripper	0.00	0.00	0.30	0.30	49957	58887	-0.0	0.0	-0.0	0.0	-0.0	0.0	-0.0	0.0	+7.2
shield	0.00	0.00	6.36	6.36	50097	58747	-0.0	0.0	-0.0	0.0	-0.0	0.0	-0.0	0.0	+1.1
RAm90	0.00	0.00	6.36	6.36	50097	58747	-0.0	0.0	-0.0	0.0	-0.0	0.0	-0.0	0.0	+1.1
PS1A	0.00	0.00	2.06	25.21	50097	58747	-66.5	81.1	-0.0	0.0	-37.3	45.5	-0.0	0.0	+1.7
Beam Dump	0.00	0.00	2.06	25.21	50097	58747	-66.5	81.1	-0.0	0.0	-37.3	45.5	-0.0	0.0	+1.7
Frag Catchers	0.00	0.00	2.06	25.21	50097	58747	-66.5	81.1	-0.0	0.0	-37.3	45.5	-0.0	0.0	+1.7
PS1B	0.00	0.00	0.41	0.37	50097	58747	-225.4	184.8	-0.0	0.0	-0.0	0.0	-0.0	0.0	-4.7
PS_I_slits	0.00	0.00	0.41	0.37	51745	56243	-106.7	106.7	-0.0	0.0	-0.0	0.0	-0.0	0.0	-4.7
PS_wdg	122.82	122.23	0.41	0.37	46416	47644	-106.7	106.7	-0.0	0.0	-0.0	0.0	-0.0	0.0	-1.7
PS1C	122.82	122.23	28.81	7.59	46416	47644	-81.1	99.8	-0.0	0.0	-10.3	11.4	-0.0	0.0	+1.5
PS1D	122.81	122.22	0.49	0.45	46416	47644	-28.9	-12.4	-0.0	0.0	-8.5	-3.7	-0.0	0.0	+1.3
PS_FP_slit	25.61	25.48	0.49	0.45	46416	47644	-21.4	-4.9	-0.0	0.0	-6.4	-1.5	-0.0	0.0	+1.3
RA90	25.61	25.48	0.45	0.49	46416	47644	-0.0	0.0	-21.4	-4.9	-0.0	0.0	-6.4	-1.5	-4.6
C_D1	25.51	25.38	0.63	0.69	46416	47644	-32.7	27.1	7.2	31.3	-0.0	0.0	-18.3	-4.2	+4.9
DB2 slits	25.51	25.38	0.63	0.69	46416	47644	-32.7	27.1	7.2	31.3	-0.0	0.0	-18.3	-4.2	+4.9
DB2 Wedge	25.51	25.38	0.63	0.69	46416	47644	-32.7	27.1	7.2	31.3	-0.0	0.0	-18.3	-4.2	+4.9
C_D2	25.50	25.38	0.37	0.70	46416	47644	-0.0	0.0	-33.3	-7.6	-0.0	0.0	7.6	33.4	-3.5
FS_F2S2:SLH_D	25.50	25.38	0.37	0.70	46416	47644	-0.0	0.0	-33.3	-7.6	-0.0	0.0	7.6	33.4	-3.5
C_D3	25.46	25.34	0.62	0.61	46416	47644	-31.3	28.5	6.8	29.5	-0.1	0.1	-53.3	-12.2	+4.9
C_D4	25.46	25.34	1.51	9.07	46416	47644	0.0	0.0	-154.4	-35.3	-0.0	0.0	2.8	12.2	-9.4
FS_F3S2:PM_D1	25.49	25.37	1.51	9.07	46402	47630	0.0	0.0	-154.4	-35.3	-0.0	0.0	2.8	12.2	-9.4
FS_F3S2:PM_D1	25.52	25.40	1.51	9.07	46387	47616	0.0	0.0	-154.4	-35.3	-0.0	0.0	2.8	12.2	-9.4
FS_F3S2:SLH/V	22.37	22.26	1.51	9.01	46387	47616	0.0	0.0	-154.4	-35.3	-0.0	0.0	2.8	12.2	-9.4



PS FP slit \rightarrow **Debug**



Set Option "Strong", then calculate ⁸⁹Tc

Menu \rightarrow 1D-Plot \rightarrow Debug Information

Menu \rightarrow 1D-Plot \rightarrow Debug Plot



 Block name 	 sPd(MeVc) 	 sPu(MeVc) 	sX(mm)	sY(mm) 	P-min	 P-max 	 x-min 	x-max	y-min	y-max	a-min	 a-max 	 b-min 	b-max	 d:
Stripper	0.00	0.00	0.30	0.30	49957	58887	-0.0	0.0	-0.0	0.0	-0.0	0.0	-0.0	0.0	+7.
shield	0.00	0.00	6.36	6.36	50097	58747	-0.0	0.0	-0.0	0.0	-0.0	0.0	-0.0	0.0	+1.:
RAm90	0.00	0.00	6.36	6.36	50097	58747	-0.0	0.0	-0.0	0.0	-0.0	0.0	-0.0	0.0	+1.:
PS1A	0.00	0.00	2.06	25.21	50097	58747	-66.5	81.1	-0.0	0.0	-37.3	45.5	-0.0	0.0	+1.
Beam Dump	0.00	0.00	2.06	25.21	50097	58747	-66.5	81.1	-0.0	0.0	-37.3	45.5	-0.0	0.0	+1.
Frag Catchers	0.00	0.00	2.06	25.21	50097	58747	-66.5	81.1	-0.0	0.0	-37.3	45.5	-0.0	0.0	+1.
PS1B	0.00	0.00	0.41	0.37	50097	58747	-225.4	184.8	-0.0	0.0	-0.0	0.0	-0.0	0.0	-4.
PS_I_slits	0.00	0.00	0.41	0.37	51745	56243	-106.7	106.7	-0.0	0.0	-0.0	0.0	-0.0	0.0	-4.
PS_wdg	122.82	122.23	0.41	0.37	46416	47644	-106.7	106.7	-0.0	0.0	-0.0	0.0	-0.0	0.0	-1.
PS1C	122.82	122.23	28.81	7.59	46416	47644	-81.1	99.8	-0.0	0.0	-10.3	11.4	-0.0	0.0	+1.
PS1D	122.81	122.22	0.49	0.45	46416	47644	-28.9	-12.4)	-0.0	0.0	-8.5	-3.7	-0.0	0.0	+1.
PS_FP_slit	25.61	25.48	0.49	0.45	46416	47644	-5.0	-2.5	-0.0	0.0	-1.5	-0.8	-0.0	0.0	+2.
RA90	25.61	25.48	0.45	0.49	46416	47644	-0.0	0.0	-5.0	-2.5	-0.0	0.0	-1.5	-0.8	-4.1
C_D1	25.51	25.38	0.63	0.69	46416	47644	-32.7	27.1	3.7	7.3	-0.0	0.0	-4.2	-2.1	+4.
DB2 slits	25.51	25.38	0.63	0.69	46416	47644	-32.7	27.1	3.7	7.3	-0.0	0.0	-4.2	-2.1	+4.
DB2 Wedge	25.51	25.38	0.63	0.69	46416	47644	-32.7	27.1	3.7	7.3	-0.0	0.0	-4.2	-2.1	+4.
C_D2	25.50	25.38	0.37	0.71	46416	47644	-0.0	0.0	-7.8	-3.9	-0.0	0.0	3.9	7.8	-3.
FS F2S2:SLH D	25.50	25.38	0.37	0.71	46416	47644	-0.0	0.0	-7.8	-3.9	-0.0	0.0	3.9	7.8	-3.
C D3	25.50	25.38	0.62	0.61	46416	47644	-31.3	28.5	3.5	6.9	-0.1	0.1	-12.4	-6.2	+4.
C_D4	25.50	25.38	1.51	10.09	46416	47644	0.0	0.0	-36.0	-18.0	-0.0	0.0	1.4	2.8	-9.
FS F3S2:PM D1	25.53	25.41	1.51	10.09	46402	47630	0.0	0.0	-36.0	-18.0	-0.0	0.0	1.4	2.8	-9.
FS F3S2:PM D1	25.56	25.44	1.51	10.09	46387	47616	0.0	0.0	-36.0	-18.0	-0.0	0.0	1.4	2.8	-9.
FS_F352:SLH/V	25.56	25.44	1.51	10.09	46387	47616	0.0	0.0	-36.0	-18.0	-0.0	0.0	1.4	2.8	-9.





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		method	89Rh	<u>89Ru</u>	89Tc	89Mo
file v4 PS_I -100 : +100	Lo Lo	No	0%	12.02%	0.03%	0%
	ribut	Moderate	1.70%	11.99%	1.08%	0.007%
PS_FP_slits : -5 : +5	dist	Strong	11.34%	13.76%	7.38%	0.20%
C_D4 1:-50 : +50	Mor	nte Carlo	6.40%	16.60%	7.23%	0.09%
		method	89Rh	89Ru	89Tc	89Mo
file v3 PS_I -10 : +10 PS_FP_slits : -4 : +4	5	No	0%	2.64%	0%	0%
	ributi	Moderate	0.06%	2.64%	0.066%	7.1e-5%
	dist	Strong	0.14%	2.64%	0.134%	3.1e-4%
C_D4 Y:25 : +25	Mor	nte Carlo	0.28%	2.45%	0.208%	
		method	89Rh	89Ru	89Tc	89Mo
	Б	No	0%	0.218%	0%	0%
file v2	ributi	Moderate	0.019%	0.291%	0.022%	5.25e-5%
PS_FP_slits : -2 : +2	dist	Strong	0.019%	0.291%	0.022%	5.25e-5%
C_D4 Y:100 : +100	Mon	nte Carlo	0.02% 10 events	0.337%	0.023%	



Benchmarks with file Debugging_v4.lpp













12

0 -30

-10

after "DB2 slits": Y'(Phi) [mrad]: window projection

-20

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