

with version 9.10.100  
from 05/22/15

1. Introduction
2. Segmented configurations
3. Extended: Geometry, Corrections
4. Optimization
5. S<sup>3</sup> acceptances
6. Outlook

Using “Spectrometer description & Beam optics studies  
for the operation of S<sup>3</sup>” (draft) and LISE<sup>++</sup> files  
by Bertrand Jacqout and Omar Kamalou



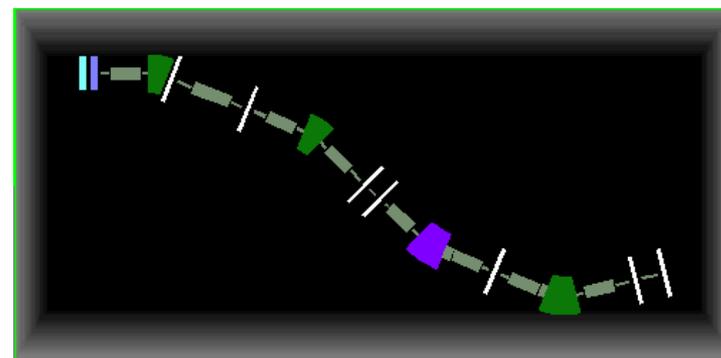
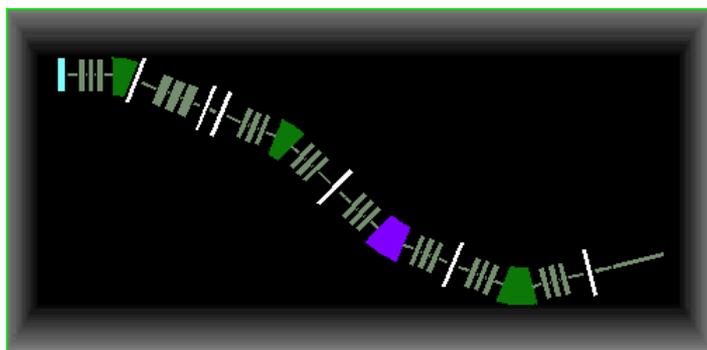
- Initially the plans were to develop LISE<sup>++</sup> configurations for S<sup>3</sup>, but Bertrand and Omar have made the main construction part
- Some insignificant updates and corrections, benchmarks
- The presentation will be updated this weekend
- and then distributed including LISE<sup>++</sup> files

*Modified 09/11/2015 for  
the LISE<sup>++</sup> package  
v.9.10.176*

	S3_dispersive_extended_OMAR	lpp	356,323
	S3-converging-BJ1	lpp	165,515
	S3-dispersiv-BJ1	lpp	184,422
	Etude Optique S3 Bjasquot-B	pdf	7,403,564



Quads are implemented,  
But B- & E-dipoles by LISE<sup>++</sup>



**In the LISE<sup>++</sup> package  
v.9.10.176  
there are two files :**

```

Vise \files \examples \GANIL \S3 \*.*
Name
-----
[.]
e_S3_dispersive
S3_converging
  
```

Corresponds to  
eS3\_dispersive v4\_5fit.lpp  
in this presentation

**Beam**

A	Element	q+
58	Ni	10
28	Z	
Stable		
Table of Nuclides		
← Z →		
← N →		
Ok		
Cancel		

Beam energy	
Energy	4.8 MeV/u
TKE	278.06 MeV
Biho	1.8296 Tm
P	5.485 GeV/c
U	2.78e+4 KV

Emittance	
Beam CARD (sigma, semi-axis, half-width...)	
1D - shape (Distribution method)	
1. X mm	1 Gaussian
2. T mrad	2 Gaussian
3. Y mm	2.5 Gaussian
4. P mrad	2 Gaussian
5. L mm	0 Gaussian
6. D %	0.1 Gaussian

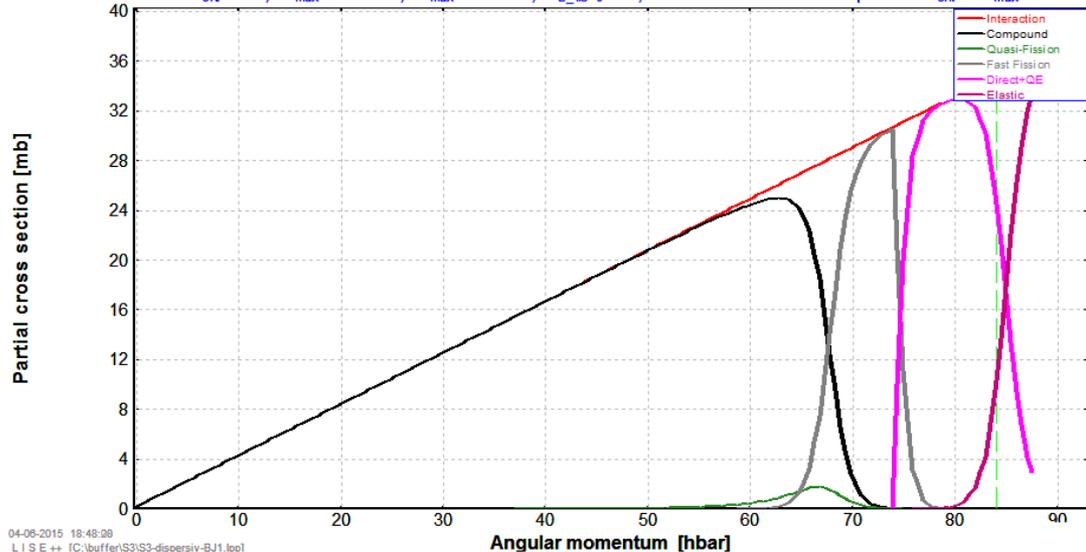
Beam intensity	
<input type="radio"/>	1e+5 enA
<input checked="" type="radio"/>	1e+4 pnA
<input type="radio"/>	6.25e+13 pps
<input type="radio"/>	2.784 KW

Energy Loss in the target box [KW] 0.0151

## Partial cross sections

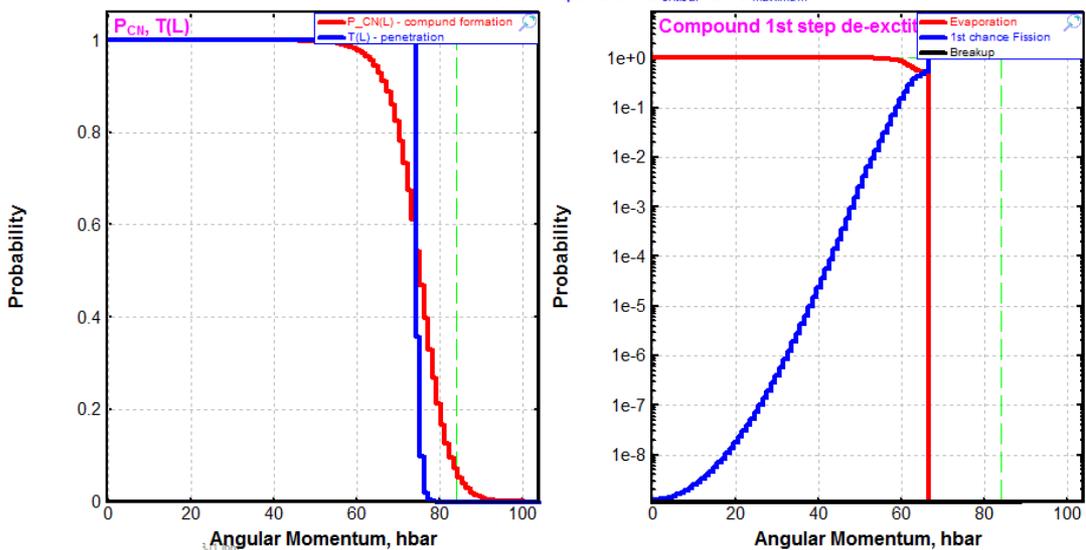
$^{58}\text{Ni}(4.8 \text{ MeV/u}) + ^{46}\text{Ti} \rightarrow ^{104}\text{Sn}^* (E_{\text{CM}}=122.9 \text{ MeV})$ ; [with  $P_{\text{CN}}$ , Penetration $^{\Omega}$ ]  
 Cross Sections[mb] : Intr=1.49e+03; Comp=9.37e+02; QF=1.42e+01; FA=2.06e+02; QE=3.31e+02;  
 $L_{\text{crit}}=104$ ;  $L_{\text{max}}^{\text{Graz}}=82.1$ ;  $L_{\text{max}}^{\text{LISE}}=84.0$ ;  $L_{\text{B\_fs}=0}=67$ ; Vertical lines correspond to  $L_{\text{crit}}$  &  $L_{\text{max}}$



04-06-2015 18:48:08  
 L I S E ++ IC:\buffer\S3\S3-dispersiv-BJ1.tot

## Probabilities as f(L)

$^{58}\text{Ni}(4.8 \text{ MeV/u}) + ^{46}\text{Ti} \rightarrow ^{104}\text{Sn}^* (E_{\text{CM}}=122.9 \text{ MeV})$ ;  $h_{\text{omega}}=5.0$   
 $L_{\text{crit}}=104$ ;  $L_{\text{max}}^{\text{Graz}}=82.1$ ;  $L_{\text{max}}^{\text{LISE}}=84.0$ ; Nuclear potential: WoodSaxon  
 Vertical lines correspond to  $L_{\text{critical}}$  &  $L_{\text{maximum}}$



<b>P</b> rojectile	$^{58}\text{Ni}^{10+}$	1us
	4.8 MeV/u	1e+4 pnA
<b>C</b> ompound	$^{104}\text{Sn}$	
<b>R</b> esidual	$^{102}\text{Sn}^{28+..28+}$	
<b>T</b> arget	$^{46}\text{Ti}$	0.01 mg/cm <sup>2</sup>
<b>Str</b> ipper	C	0.04 mg/cm <sup>2</sup>
<b>d</b> rift	Drift 2	standard 50 cm

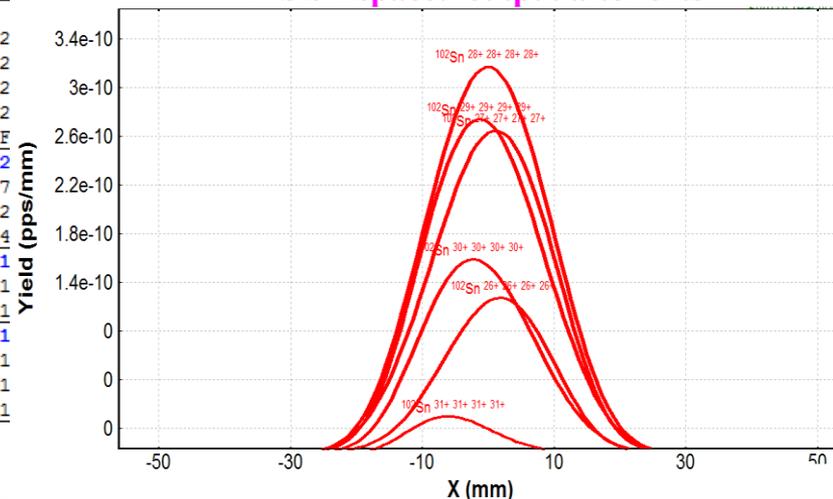


statistics: 102Sn

102Sn	Beta+ decay (Z=50, N=52)		Tin			
All reactions total isotope rate	2.55e-8	pps				
and Overall isotope transmission	73.945	%				
Q1 (D11)	31	30	29	28	27	2
Q2 (D21)	31	30	29	28	27	2
Q3 (ED31)	31	30	29	28	27	2
Q4 (D41)	31	30	29	28	27	2
Reaction	FusRes	FusRes	FusRes	FusRes	FusRes	F
Ion Production Rate (pps)	4.6e-10	3.31e-9	6.1e-9	7.2e-9	5.91e-9	2
Total ion transmission (%)	1.333	9.602	17.689	20.854	17.117	7
Total: this reaction (pps)	2.55e-8	2.55e-8	2.55e-8	2.55e-8	2.55e-8	2
X-Section in target (mb)	4.22e-12	4.22e-12	4.22e-12	4.22e-12	4.22e-12	4
Target (%)	100	100	100	100	100	1
Unreacted in material (%)	100	100	100	100	100	1
Unstopped in material (%)	100	100	100	100	100	1
Stripper (%)	5.6	12.25	19.47	22.52	18.93	1
Unreacted in material (%)	100	100	100	100	100	1
Q (Charge) ratio (%)	5.6	12.25	19.47	22.52	18.93	1
Unstopped in material (%)	100	100	100 </td <td>100</td> <td>100</td> <td>1</td>	100	100	1

converging

F4bis-Xspace: output after slits

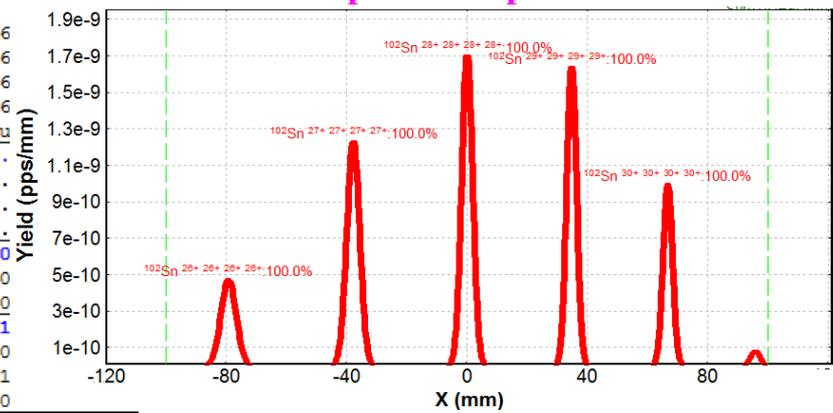


statistics: 102Sn

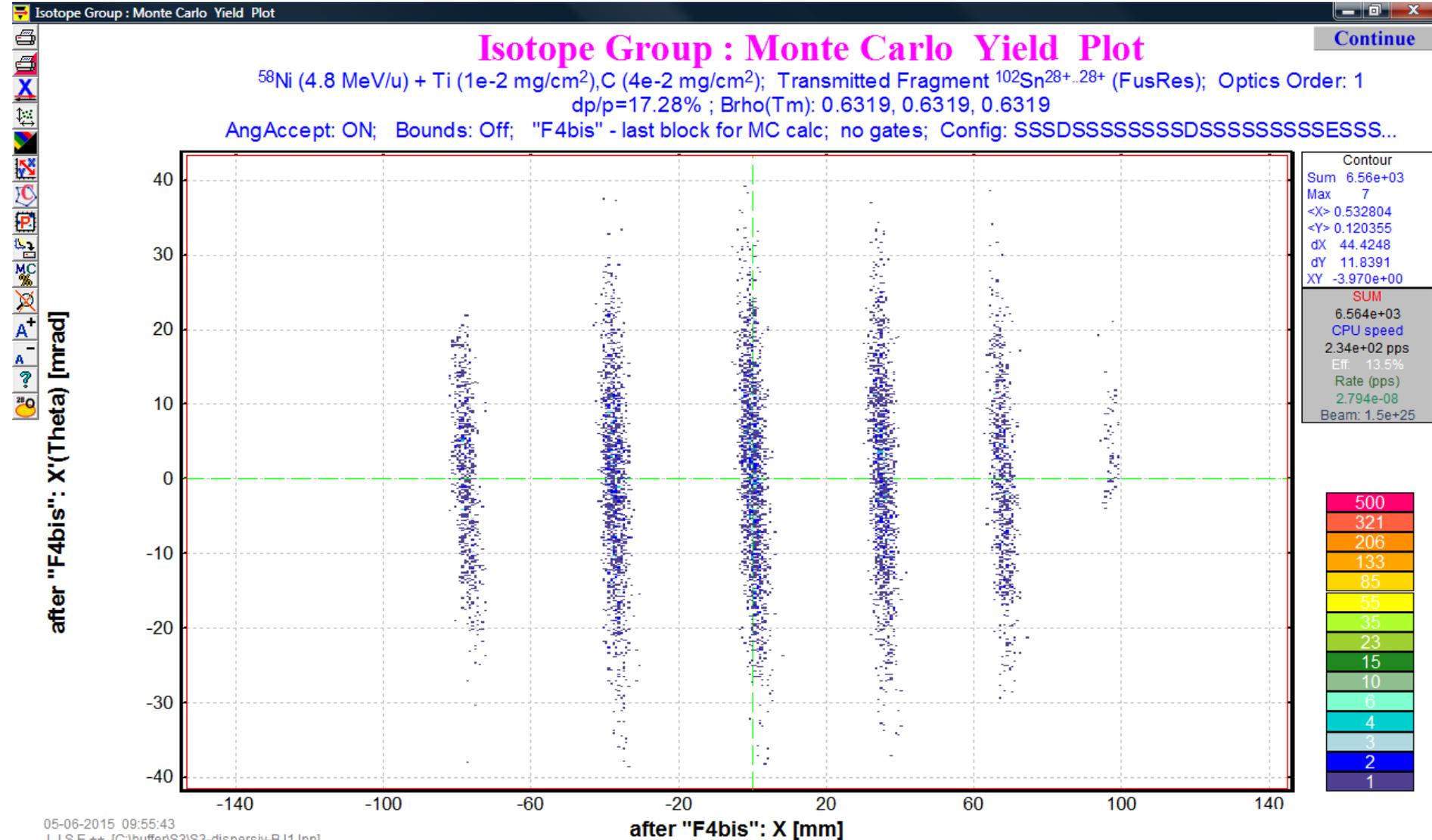
102Sn	Beta+ decay (Z=50, N=52)		Tin			
All reactions total isotope rate	2.8e-8	pps				
and Overall isotope transmission	81.237	%				
Q1 (D11)	31	30	29	28	27	26
Q2 (D21)	31	30	29	28	27	26
Q3 (ED31)	31	30	29	28	27	26
Q4 (D41)	31	30	29	28	27	26
Reaction	FusRes	FusRes	FusRes	FusRes	FusRes	Fu
Ion Production Rate (pps)	3.06e-10	3.85e-9	6.69e-9	7.75e-9	6.49e-9	2
Total ion transmission (%)	0.888	11.164	19.381	22.459	18.82	8
Total: this reaction (pps)	2.8e-8	2.8e-8	2.8e-8	2.8e-8	2.8e-8	2
X-Section in target (mb)	4.22e-12	4.22e-12	4.22e-12	4.22e-12	4.22e-12	4
Target (%)	100	100	100	100	100	10
Unreacted in material (%)	100	100	100	100	100	10
Unstopped in material (%)	100	100	100	100	100	10
Stripper (%)	5.6	12.24	19.47	22.52	18.93	11
Unreacted in material (%)	100	100	100	100	100	10
Q (Charge) ratio (%)	5.6	12.24	19.47	22.52	18.93	11
Unstopped in material (%)	100	100	100	100	100	10

dispersive

F4bis-Xspace: output before slits



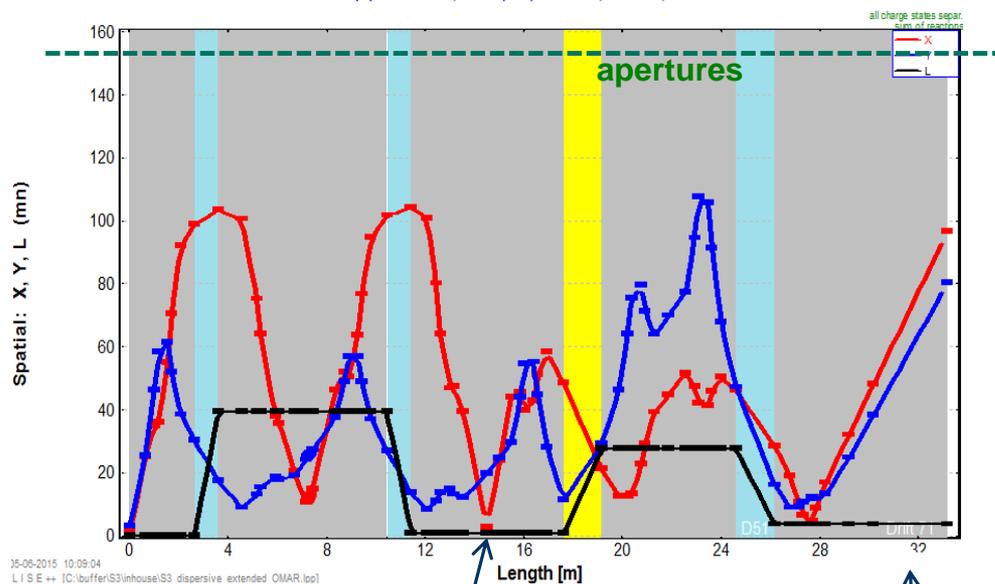
## Dispersive, 1<sup>st</sup> order . X/T @ F4 bis





## Beam Sigmas: spatial

$^{40}\text{Ar}$  (9.7 MeV/u) + Be (10  $\mu\text{m}$ ); Settings on  $^{40}\text{Ar}^{17+}$ ; Config: SSSSSSDSSSSSSSSSSSSSSSS...  
 $\text{dp}/p=29.71\%$ ;  $\text{Brho}(\text{Tm}): 1.0304, 1.0304, 1.0304$

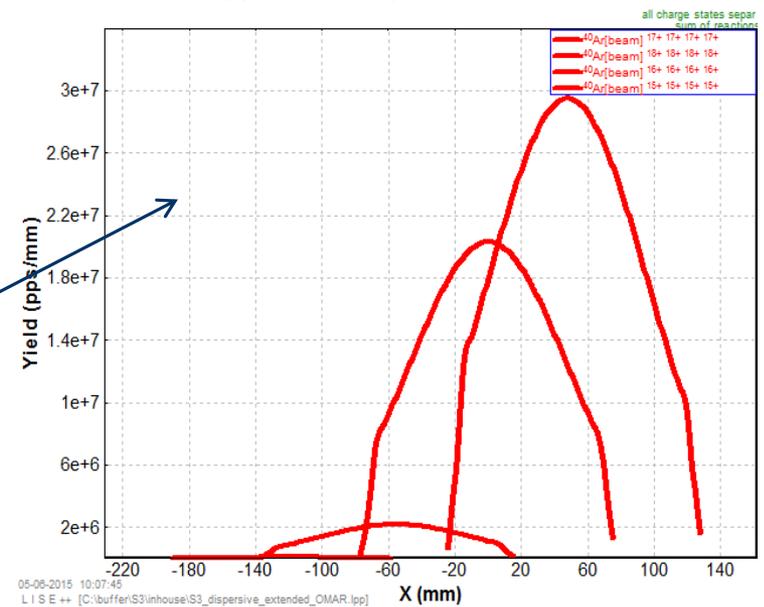


statistics: 40Ar

40Ar	Stable (Z=18, N=22)	Argon		
All reactions total isotope rate 5.42e+9 pps				
and Overall isotope transmission 86.7 %				
Q1 (D11)	18	17	16	15
Q2 (D22)	18	17	16	15
Q3 (ElecDip 1)	18	17	16	15
Q4 (D51)	18	17	16	15
Reaction	BEAM	BEAM	BEAM	BEAM
Ion Production Rate (pps)	3.07e+9	2.12e+9	2.26e+8	7.15e+6
Total ion transmission (%)	49.102	33.864	3.619	0.114
Total: this reaction (pps)	5.42e+9	5.42e+9	5.42e+9	5.42e+9
X-Section in target (mb)	beam	beam	beam	beam
Target (%)	56.65	38.98	4.18	0.162
X space transmission (%)	100	100	100	100
Y space transmission (%)	100	100	100	100
Unreacted in material (%)	100	100	100	100
Q (Charge) ratio (%)	56.66	38.99	4.18	0.162
Unstopped in material (%)	100	100	100	100

## F4bis-Xspace: output after slits

(9.7 MeV/u) + Be (10  $\mu\text{m}$ ); Settings on  $^{40}\text{Ar}^{17+}$ ; Config: SSSSSSDSSSSSSSSSS...  
 $\text{dp}/p=29.71\%$ ;  $\text{Brho}(\text{Tm}): 1.0304, 1.0304, 1.0304$



15-06-2015 10:09:04  
 L I S E ++ [C:\buffer\S3\inhouse\S3\_dispersive\_extended\_OMAR.lpp]

05-06-2015 10:07:45  
 L I S E ++ [C:\buffer\S3\inhouse\S3\_dispersive\_extended\_OMAR.lpp]

Tuning dipole

<b>P</b>	<b>rojectile</b>	$^{40}\text{Ar}^{16+}$	
		9.74 MeV/u	1 pA
<b>F</b>	<b>ragment</b>	$^{40}\text{Ar}^{17+..17+}$	=beam=
<b>T</b>	Target	$^9\text{Be}$	10 $\mu\text{cron}$
<b>St</b>	Stripper		
<b>D</b>	tuning	<b>Brho</b>	1.0000 Tm
<b>d</b>	DR11	<b>standard</b>	62.4 cm
<b>Q</b>	SC_Q11	<b>QUAD</b>	4.05 kG

tuning

Dispersive block (M-dipole)

Brho 1 + Tm  
- T

B 0.33333 + T  
- T

Bend Sector

Radius = 3 m

Angle = 0.001 deg

Length = 0.0001 m

Allow remote matrices calculation

Matrix calculations

Optical block properties and data

Section-Element construction property

S-block (Section)  E-block (Element)  ?

Setting Charge state for the Block (Z-Q) 1

Calculate the Values using the Setting fragment from

Target

D11

Tweak 0.1 %

Calculate other optic blocks

Cut(Slits) & Acceptances     Optical matrix     General setting of block     Calibration file

Matrix calculations

## Quad fields have been checked, Sext fields been entered

S3MS_1 : NOMINAL , momentum DISpersion F1 : 10 mm/% for Magnetic rigidity = 1.000 T/m			
Triplet	Quadrupole (T/m) B1= dB <sub>y</sub> /dx	Hexapole (T/m <sup>3</sup> ) B2= d <sup>2</sup> B <sub>y</sub> /d <sup>2</sup> x	Octupole (T/m <sup>3</sup> ) B3= d <sup>3</sup> B <sub>y</sub> /d <sup>3</sup> x
	Q11= +2.700	HX11=0	OC11=0
T1	Q12= -5.563	HX12=+2.86	OC 12=0
	Q13= +2.700	HX13=- 0.667	OC 13= +20
	Q21= +1.331	HX21=+1.60 (B2eff*)	No octupolar correction
T2	Q22= -2.131	HX22=+1.27 (B2eff*)	No octupolar correction
	Q23= +1.331	HX23=+1.12 (B2eff*)	No octupolar correction
	Q24= +2.408	HX24=+4.01	OC 24=- 37.2
T3	Q25= -4.3992	HX25=+1.15	OC 25=0
	Q26= +2.156	HX26=+6.36	OC 26=0
	Q31 =+2.702	HX31=+1.82	OC 31=0
T4	Q32 =-5.266	HX 32=0	OC 32=+59.5
	Q33= +2.702	HX 33=0	OC 33=0



		Quad			Hexa	
		Q	T/m	KG	T/m <sup>2</sup>	KG
T1	Q11		2.7	4.050	0	0.000
	Q12		-5.563	-8.345	2.86	0.644
	Q13		2.7	4.050	-0.667	-0.150
T2	Q21		1.331	1.997	1.6	0.360
	Q22		-2.131	-3.197	1.27	0.286
	Q23		1.331	1.997	1.12	0.252
T3	Q24		2.408	3.612	4.01	0.902
	Q25		-4.3992	-6.599	1.15	0.259
	Q26		2.156	3.234	6.36	1.431
T4	Q31		2.702	4.053	1.82	0.410
	Q32		-5.266	-7.899	0	0.000
	Q33		2.702	4.053	0	0.000

S3MS_1 : for Magnetic rigidity = 1.000 T/m			
Triplet	Quadrupole (T/m) B1= dB <sub>y</sub> /dx	Hexapole (T/m <sup>3</sup> ) B2= d <sup>2</sup> B <sub>y</sub> /d <sup>2</sup> x	Octupole (T/m <sup>3</sup> ) B3= d <sup>3</sup> B <sub>y</sub> /d <sup>3</sup> x
	Q34= +4.3878	HX34=-2.25113	OC34= 0
T5	Q35= -6.0251	HX 35=-3.56469	OC 35=+59.8
	Q36= +3.1112	HX36=-0.4186	OC 36=-38.8
	Q41= +2.2873	HX 41=-6.410	OC 41= 0
T6	Q42= -4.0025	HX 42=-0.824	OC 42= 0
	Q43= +2.5066	HX 43=-0.879	OC 43= 0
	Q44= +2.2864	HX 44=-2.637	OC 44= -30.2
T7	Q45=4.1239	HX 45=-0.732	OC 45= 0
	Q46= +1.9718	HX 46=-6.641	OC 46= 0
	Q51 =+2.1550	HX 51=+2.01 for T <sub>127</sub> =0	OC 51=-28.7
T8	Q52 =-4.190	HX 52=-2.0 for T <sub>127</sub> =0	OC 52=+130.0
	Q53= +2.155	HX 53= -5.0 for T <sub>127</sub> =0	OC 53= 130.0



MASS SPECTROMETER BEAM OPTICS : "MASS DISPERSIVE MODE, 1"						
		Quad			Hexa	
		Q	T/m	KG	T/m <sup>2</sup>	KG
T5	Q34		4.3878	6.582	-2.25113	-0.507
	Q35		-6.0251	-9.038	3.56469	0.802
	Q36		3.1112	4.667	-0.4186	-0.094
T6	Q41		2.2873	3.431	-6.41	-1.442
	Q42		-4.0025	-6.004	-0.824	-0.185
	Q43		2.5066	3.760	-0.879	-0.198
T7	Q44		2.2864	3.430	-2.637	-0.593
	Q45		-4.1239	-6.186	-0.732	-0.165
	Q46		1.9718	2.958	-6.641	-1.494
T8	Q51		2.155	3.233	2.01	0.452
	Q52		-4.19	-6.285	-2	-0.450
	Q53		2.155	3.233	-5	-1.125



Second triplet parameters  
have been modified

	drift	DR21	3.589	0.9585
	<Quad>	NSC_Q21	4.547	0.6080
	drift	DR22	5.155	0.1470
	<Quad>	NCS_Q22	5.302	0.6130
	drift	DR23	5.915	0.1470
	<Quad>	NCS_Q23	6.062	0.6130
	drift	DR_24	6.675	0.4635

Triplet 2 (normal conducting, open)			
S3N-DR21	mm	1035	$1035 - (619.8 - 450) / 2 = 950.6$
S3N-Q21 type N.C. open Triplet 2 ( $L=2141.8$ )	mm	450	619.8
S3N-DR22	mm	310	$310 - (619.8 - 450) = 141.2$
S3N-Q22 type N.C. open	mm	450	619.8
S3N-DR23	mm	310	$310 - (619.8 - 450) = 141.2$
S3N-Q23 type N.C. open	mm	450	619.8
S3N-DR24	mm	825	$825 - (619.8 - 450) / 2 = 740.6$
F1	mm	0	0

Final File for fitting after updates and modifications: eS3\_dispersive v4.lpp

## Effective lengths

Quad type	L	R	Leff_S3	a_S3
1	0.5	0.15	0.3782	-0.812
2	0.45	0.15	0.6198	1.132

Wrong geometrical values in the document

Should be around 0.5-1.0

Optics fit

Blocks with parameters to vary

- #03 Position@034: SC\_Q33
- #04 Position@042: SC\_Q34
- #05 Position@044: SC\_Q35
- #06 Position@048: SC\_Q36
- #07 Position@054: SC\_Q41
- #08 Position@058: SC\_Q42
- #09 Position@062: SC\_Q43
- #10 Position@068: SC\_Q44
- #11 Position@072: SC\_Q45
- #12 Position@076: SC\_Q46
- #13 Position@082: SC\_Q51
- #14 Position@086: SC\_Q52
- #15 Position@090: SC\_Q53

Constraint blocks

- #17 Position@074: s3 < 150
- #18 Position@077: s1 < 150
- #19 Position@078: s3 < 150
- #20 Position@083: s1 < 150
- #21 Position@084: s3 < 150
- #22 Position@087: s1 < 150
- #23 Position@088: s3 < 150
- #24 Position@091: s1 < 150
- #25 Position@092: s3 < 150
- #26 Position@096: R12 = 0
- #27 Position@097: R34 = 0
- #28 Position@098: R16 = 0
- #29 Position@099: s3 < 20

N iter = 30

Fit

Restore previous values

Fit Settings

Matrix Plot

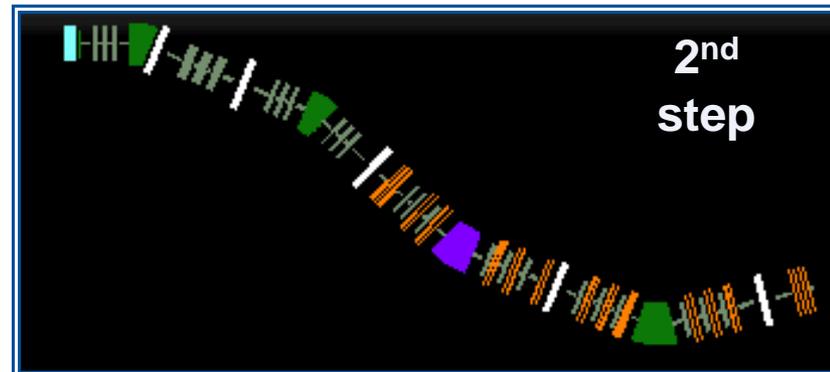
Exit

Help

Browse output file

Beam-Sigma Plot

eS3\_dispersive v4\_5fit.fit



(fast editing)

Given Name	Start(m)	Length(m)	B0(kG)	Br(Tm)cor/real	DriftM*/Angle	Rapp(cm)*/Rl...	Left(m)*/Ldip(m)	2 nd order	CalcMatr/Z-Q	AngAcc.Apps.	Its	COSY IFit	SE
Fr 22	23.990	0.0000										s3 < 150	
DR_48	23.990	0.6034			standard								
D51	24.593	1.5708	-4.0000	* 1.0000	* .36.0	* 2.5000	* 1.5708	yes	* 1 R	-- V			
DR51	26.164	0.6030			standard								
SC_Q51	26.767	0.3782	+2.7982	1.0000	MULT	15.0000	0.3782	yes	1 R	-- HV		FIT	
Fr 23	27.145	0.0000										s1 < 150	
Fr 24	27.145	0.0000										s3 < 150	
d drift	DR52	27.145	0.1584		standard								
<Quad>	SC_Q52	27.303	0.3782	-5.8455	1.0000	MULT	15.0000	0.3782	yes	1 R	-- HV		FIT
Fr 25	27.682	0.0000										s1 < 150	
Fr 26	27.682	0.0000										s3 < 150	
d drift	DR53	27.682	0.1584		standard								
<Quad>	SC_Q53	27.840	0.3782	+3.4556	1.0000	MULT	15.0000	0.3782	yes	1 R	-- HV		FIT
Fr 27	28.218	0.0000										s1 < 150	
Fr 28	28.218	0.0000										s3 < 150	
d drift	DR54	28.218	0.9454		standard								
S slits_	F4	29.164	0.0000		SLITS								
d drift	F4bis	29.164	1.0000		standard								
Fr	foc4 x	30.164	0.0000									R12 = 0	
Fr	foc4 y	30.164	0.0000									R34 = 0	
Fr	disp4	30.164	0.0000									R16 = 0	
Fr	beamy4	30.164	0.0000									s3 < 20	
d drift	Drift 64	30.164	0.1000		standard								

Selected block: Dispersive (M-dipole)

Block Length [m]: 0.00005

Length after this block [m]: 0.0001

Charge State (Z-Q) = 1

Angular acceptance (mrad): Horizontal  $\pm$  [ ] Use [ ] Vertical  $\pm$  [ ] Use [ ]

Shape: Rectangle  Ellipse

Inside Aperture (mm): min max Use X = [-50 50] Y = [-50 50]

Slits (mm) after this BLOCK: min max Use X = [ ] Y = [ ]

Shape: Rectangle  Ellipse

1-st order Matrix Elements: Matrix Plot, Beam-Sigma Plot, View

Quit Help

## Short optimization test

**Final**

Global matrix						Optical matrix - F4bis						Beam (sig)	
0.9188	0.00173	0	0	0	0.01259	[mm]						0.9274	
-0.9729	1.08653	0	0	0	-2.07615	[mrad]						20.8127	
0	0	4.8161	-0.93108	0	0	[mm]						14.4483	
0	0	-1.13235	0.21494	0	0	[mrad]						3.4038	
0.18957	0.00167	0	0	1	6.56578	[mm]						65.6581	
0	0	0	0	0	1	[%]						10	
/[mm]	/[mrad]	/[mm]	/[mrad]	/[mm]	/[%]								
Det = 0.99999						2-nd order view							

Dispersive, 1<sup>st</sup> order . @ F4 bis

F	Fit	Fit 27	28.218	0.0000	s1 < 150	e
F	Fit	Fit 28	28.218	0.0000	s3 < 150	e
d	drift	DR54	28.218	0.9454	-	e
S	_slits_	F4	29.164	0.8000	-	e
d	drift	F4bis	29.164	1.0000	-	e
F	Fit	foc4 x	30.164	0.0000	R12 = 0	e
F	Fit	foc4 y	30.164	0.0000	R34 = 0	e
F	Fit	disp4	30.164	0.0000	R16 = 0	e
F	Fit	beamy4	30.164	0.0000	s3 < 20	e
d	drift	Drift 64	30.164	0.1000	-	e

**Init**

Global matrix						Beam (sig)	
1.16493	1.19835	0	0	0	0.47558	[mm]	47.9507
-0.44223	0.40371	0	0	0	-0.52224	[mrad]	16.1627
0	0	4.15726	0.90263	0	0	[mm]	38.1985
0	0	0.50769	0.35085	0	0	[mrad]	14.1163
0.03985	0.08185	0	0	1	-1.17782	[mm]	3.4795
0	0	0	0	0	1	[%]	1
/[mm]	/[mrad]	/[mm]	/[mrad]	/[mm]	/[%]		
Det = 1.00054						2-nd order view	

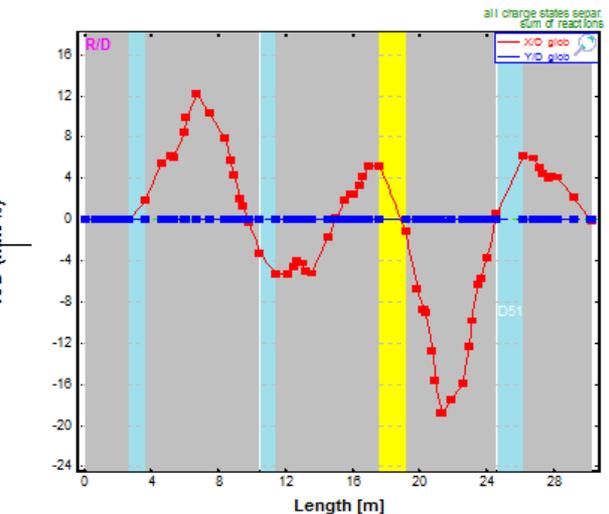
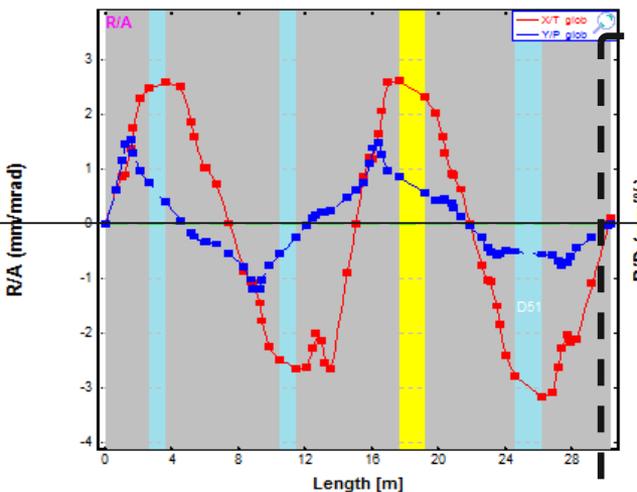
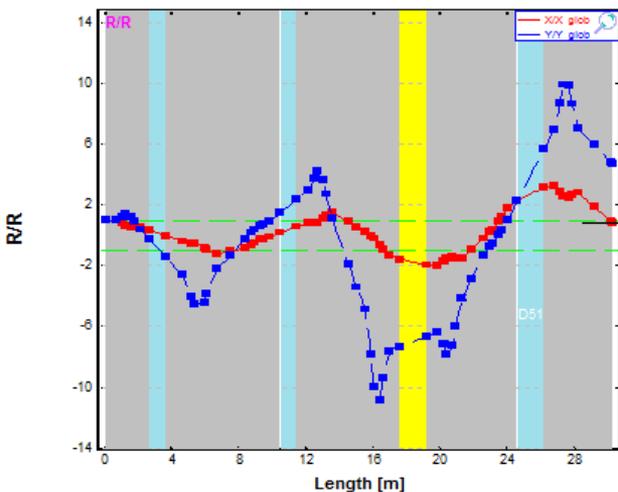
A lot of improvement and optimization should be done more in the LISE++ optimization process !!!!

## Short optimization test

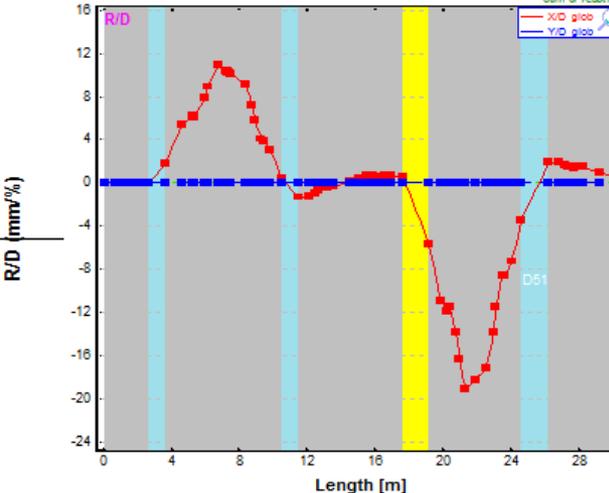
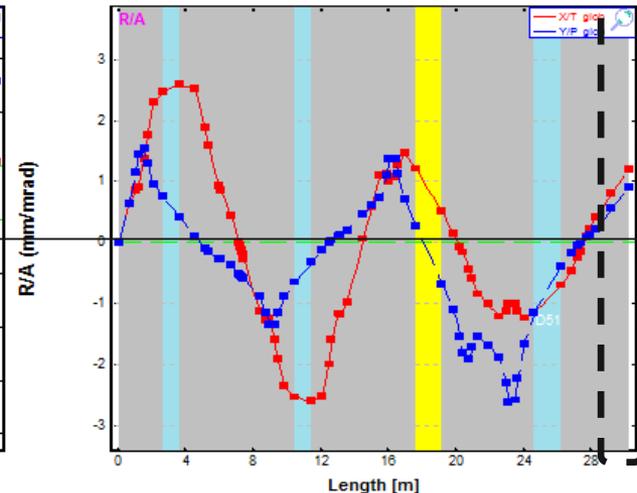
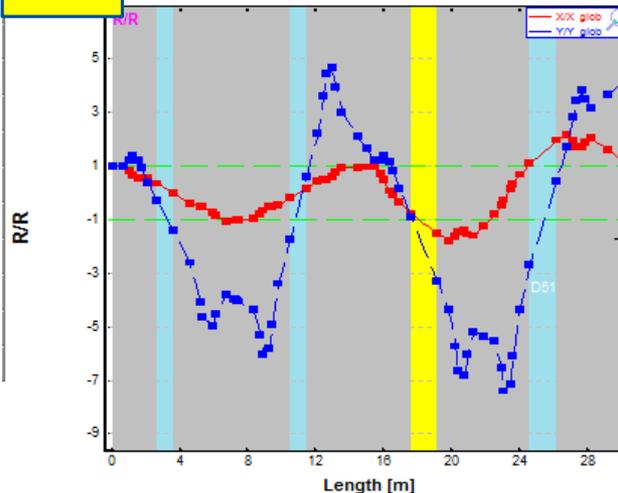
### First order matrix elements

$^{40}\text{Ar}$  (9.7 MeV/u) + Be (10  $\mu\text{m}$ ); Settings on  $^{40}\text{Ar}^{17+-17+}$ ; Config: DSSSSSSSDSSSSSSSSSSSSSSSSSSSD...  
dp/p=29.24% ; Brho(Tm): 1.0000, 1.0000, 1.0000, 1.0000

Final



Init

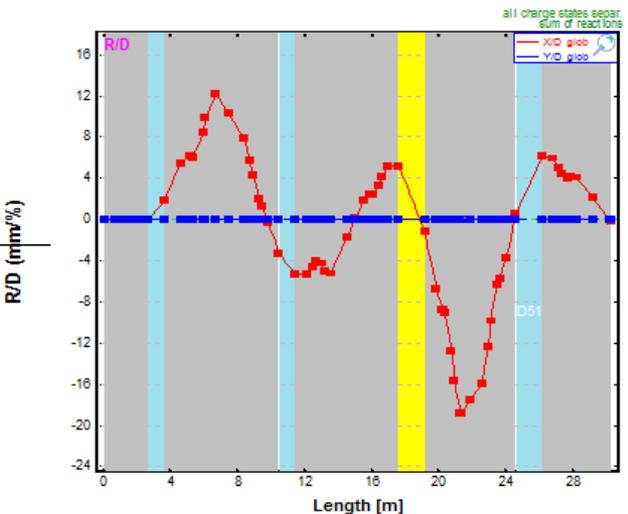
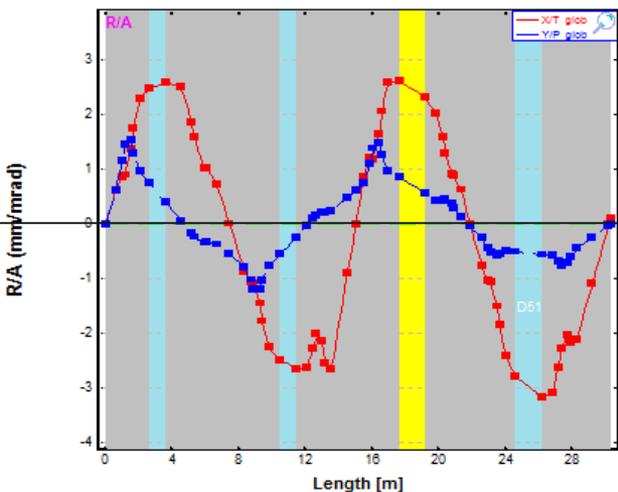
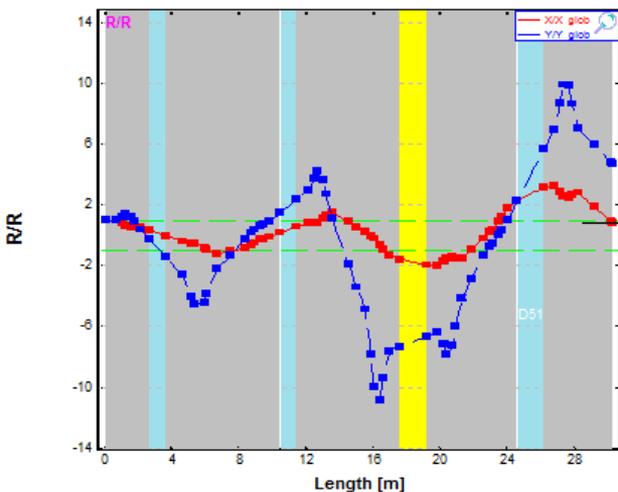


## Short optimization test

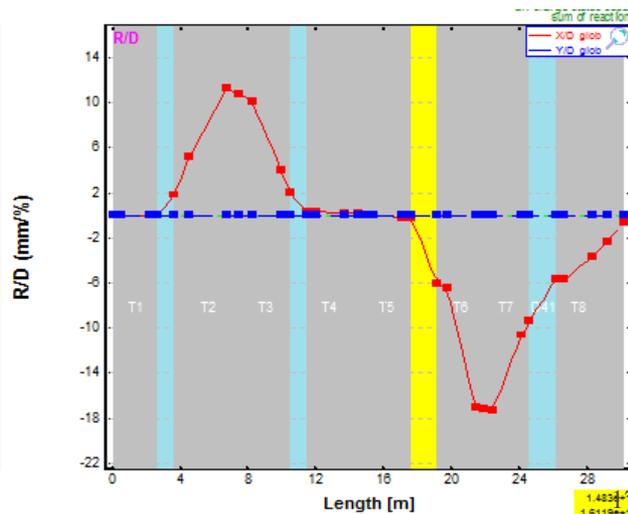
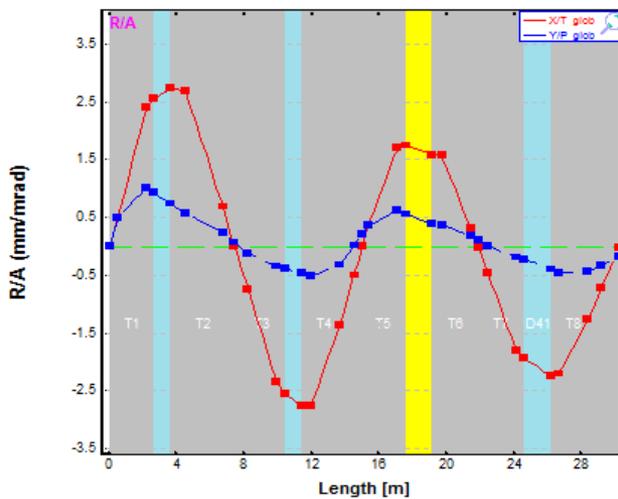
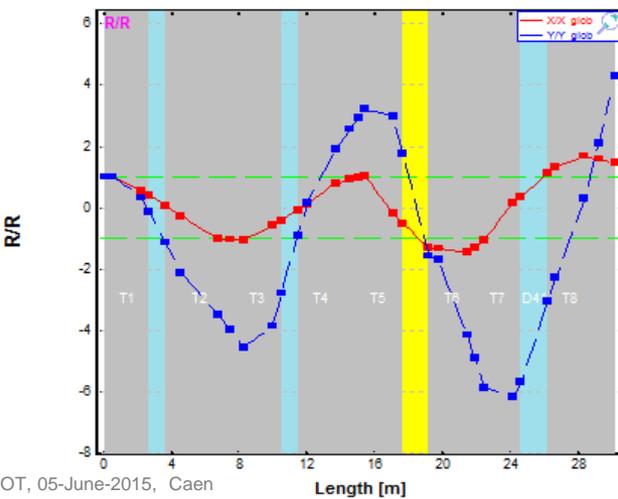
### Extended Final

### First order matrix elements

$^{40}\text{Ar}$  (9.7 MeV/u) + Be (10  $\mu\text{m}$ ); Settings on  $^{40}\text{Ar}^{17+-17+}$ ; Config: DSSSSSSSDSSSSSSSSSSSSSSSSSSSD...  
 $dp/p=29.24\%$  ; Brho(Tm): 1.0000, 1.0000, 1.0000, 1.0000



### Segmented



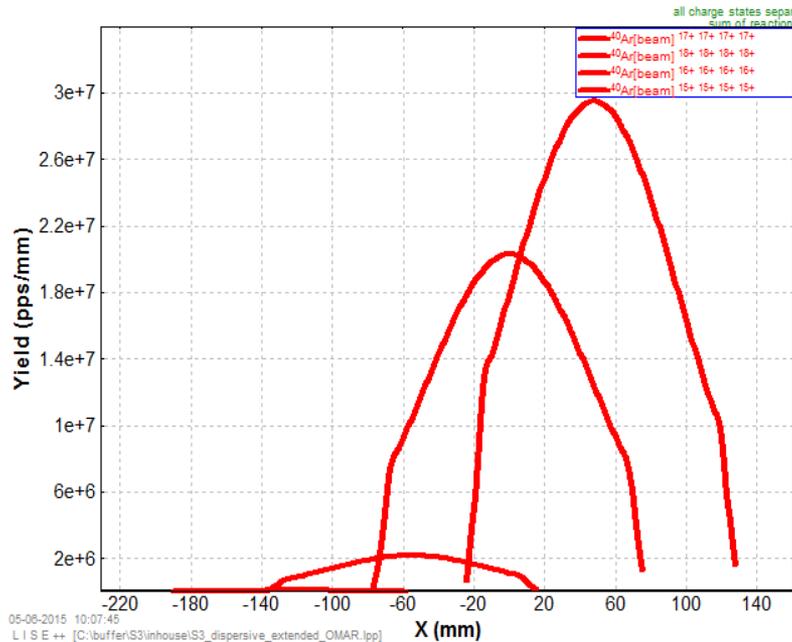
## Short optimization test

**Init**

**Final**

### F4bis-Xspace: output after slits

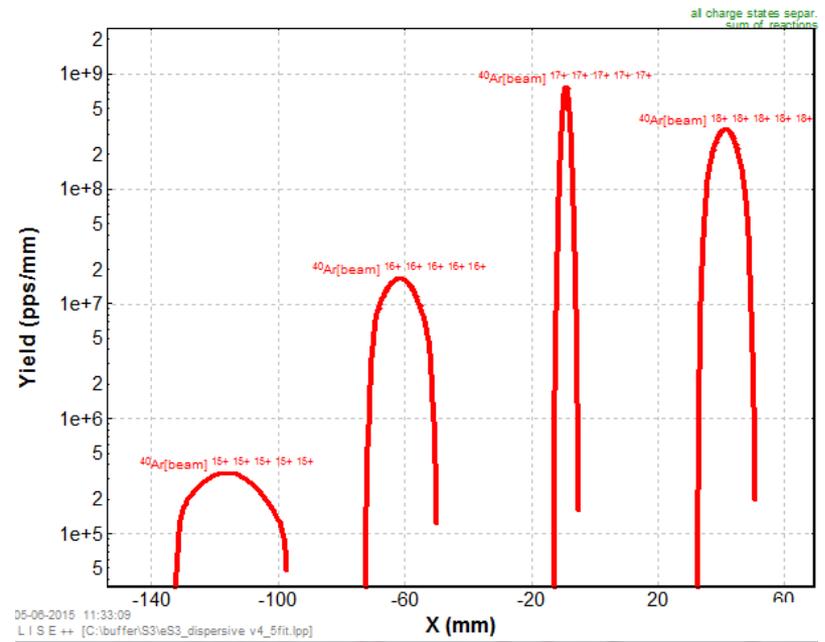
(9.7 MeV/u) + Be (10  $\mu$ m); Settings on  $^{40}\text{Ar}^{17+..17+}$ ; Config: SSSSSSDSSSSSSSSSS  
dp/p=29.71% ; Brho(Tm): 1.0304, 1.0304, 1.0304



File: eS3\_dispersive v4.lpp

### foc4 x-Xspace: output after slits

7 MeV/u) + Be (10  $\mu$ m); Settings on  $^{40}\text{Ar}^{17+..17+}$ ; Config: DSSSSSDSSSSSSSSSS  
dp/p=29.24% ; Brho(Tm): 1.0000, 1.0000, 1.0000, 1.0000

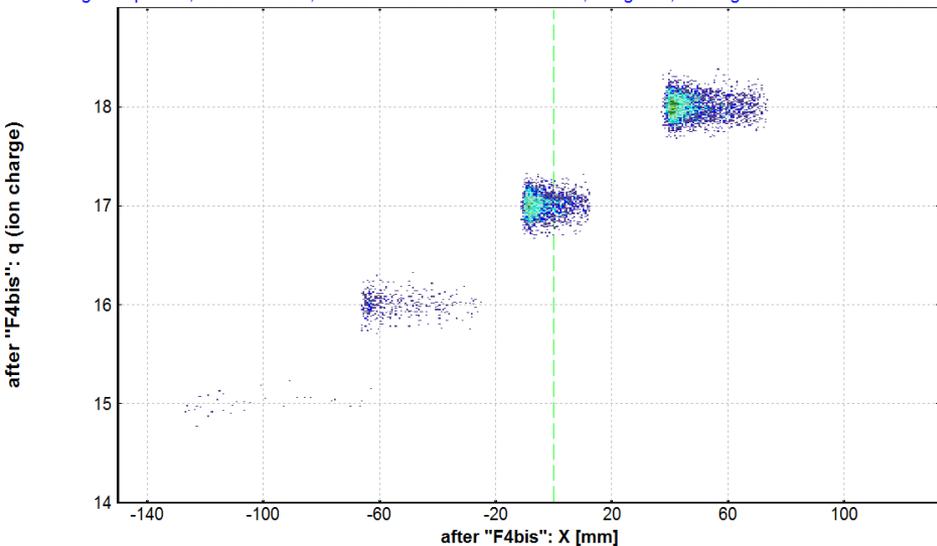


File: eS3\_dispersive v4\_5fit.lpp

## Isotope Group : Monte Carlo Yield Plot

$^{40}\text{Ar}$  (9.7 MeV/u) + Be (10  $\mu\text{m}$ ); Transmitted Fragment  $^{40}\text{Ar}^{17+..17+}$  (beam); Optics Order: 1  
 $dp/p=29.24\%$ ; Brho(Tm): 1.0000, 1.0000, 1.0000, 1.0000

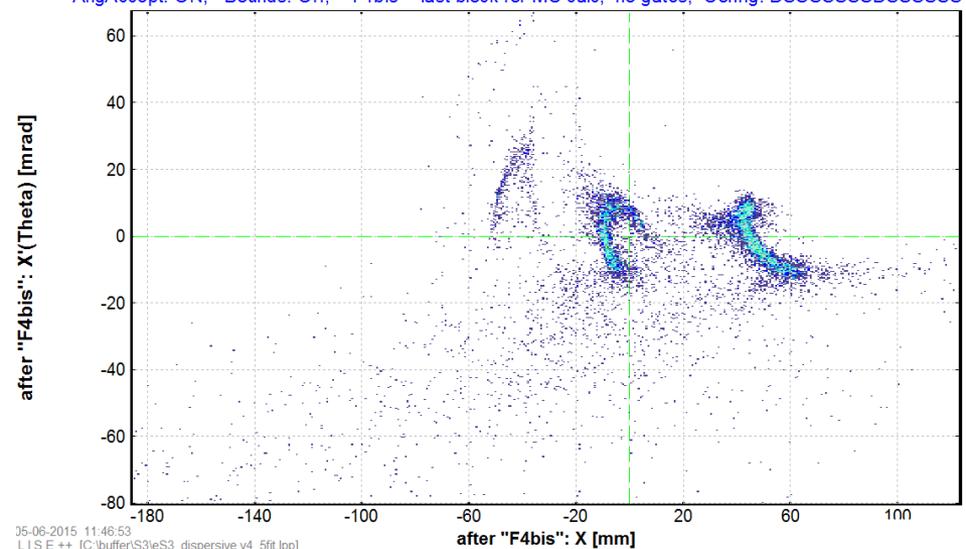
AngAccept: ON; Bounds: Off; "F4bis" - last block for MC calc; no gates; Config: DSSSSSSSDSSSSSS



## Isotope Group : Monte Carlo Yield Plot

$^{40}\text{Ar}$  (9.7 MeV/u) + Be (10  $\mu\text{m}$ ); Transmitted Fragment  $^{40}\text{Ar}^{17+..17+}$  (beam); Optics Order: 1  
 $dp/p=29.24\%$ ; Brho(Tm): 1.0000, 1.0000, 1.0000, 1.0000

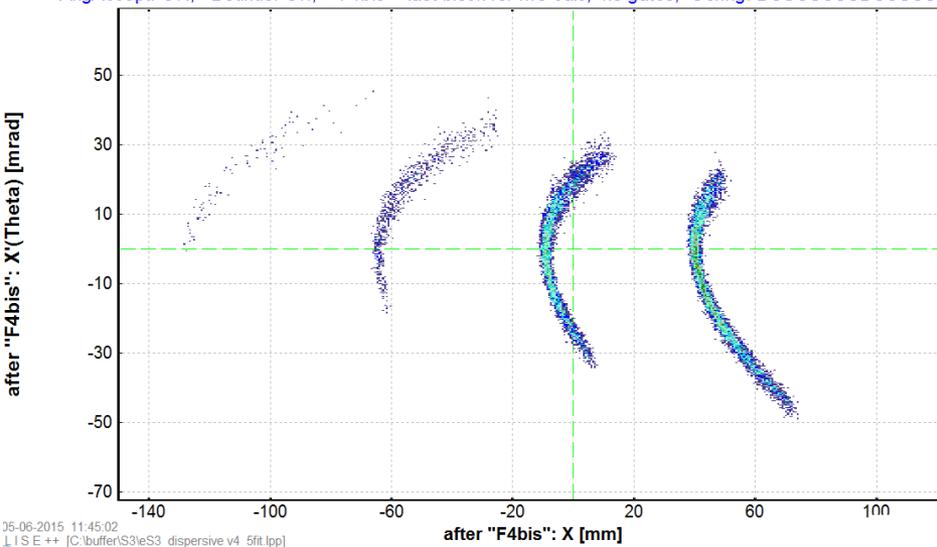
AngAccept: ON; Bounds: Off; "F4bis" - last block for MC calc; no gates; Config: DSSSSSSSDSSSSSS



## Isotope Group : Monte Carlo Yield Plot

$^{40}\text{Ar}$  (9.7 MeV/u) + Be (10  $\mu\text{m}$ ); Transmitted Fragment  $^{40}\text{Ar}^{17+..17+}$  (beam); Optics Order: 1  
 $dp/p=29.24\%$ ; Brho(Tm): 1.0000, 1.0000, 1.0000, 1.0000

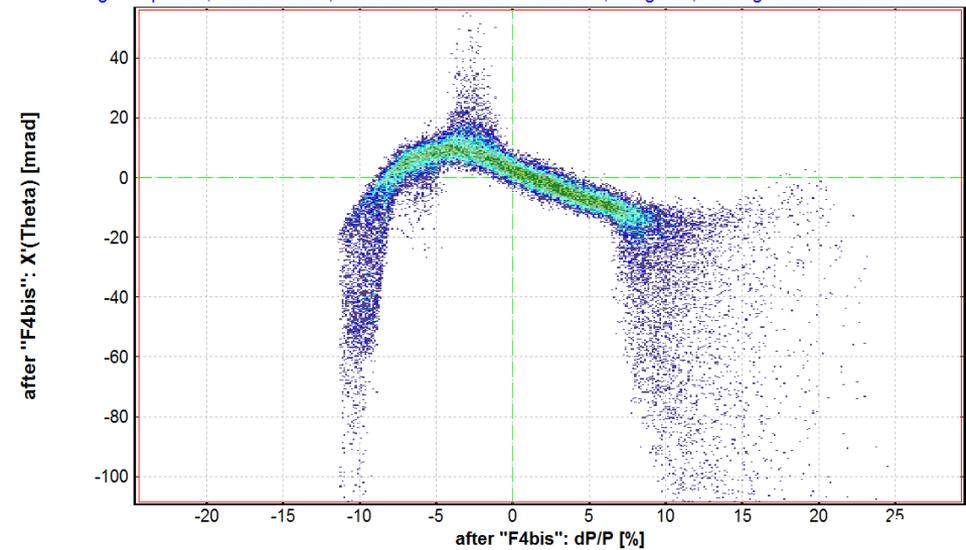
AngAccept: ON; Bounds: Off; "F4bis" - last block for MC calc; no gates; Config: DSSSSSSSDSSSSSS



## $^{40}\text{Ar}$ : Monte Carlo Transmission Plot

$^{40}\text{Ar}$  (9.7 MeV/u) + Be (10  $\mu\text{m}$ ); Transmitted Fragment  $^{40}\text{Ar}^{17+..17+}$  (beam); Optics Order: 1  
 $dp/p=29.24\%$ ; Brho(Tm): 1.0000, 1.0000, 1.0000, 1.0000

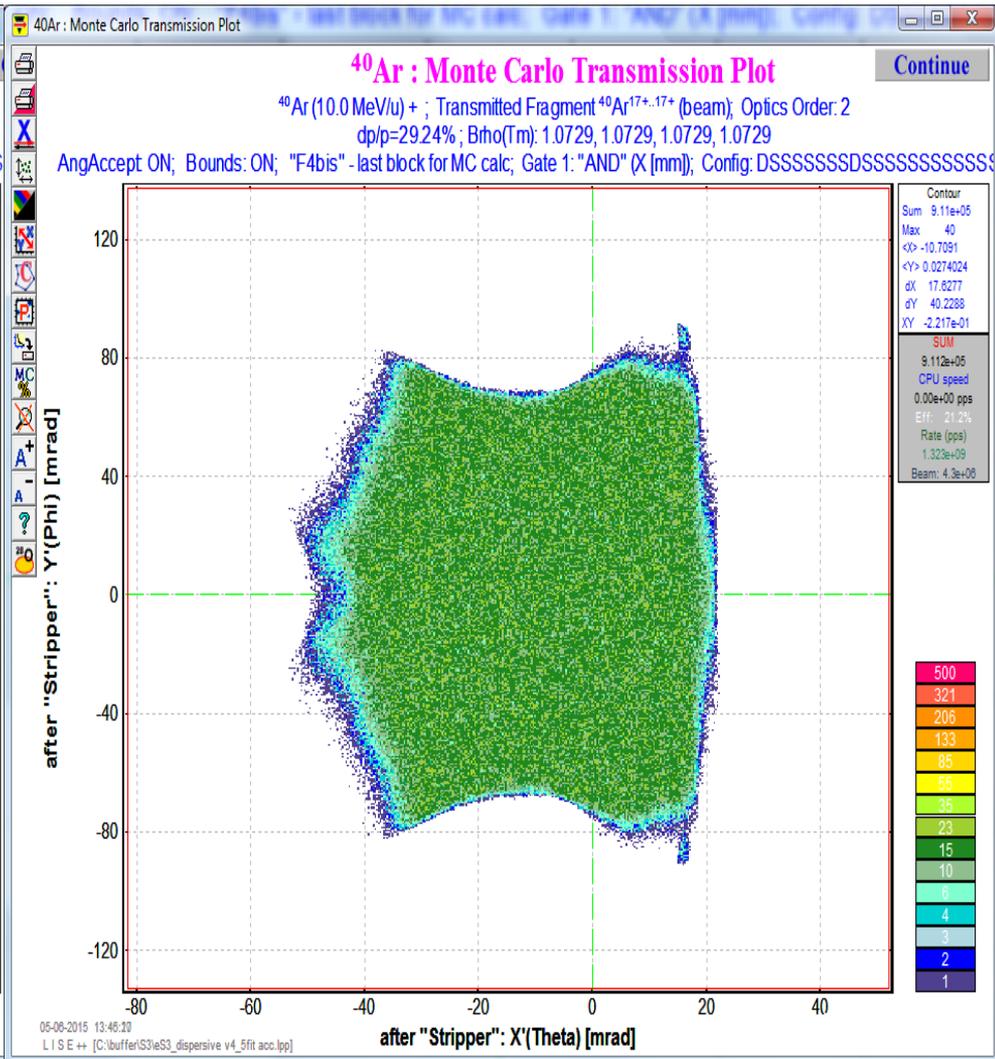
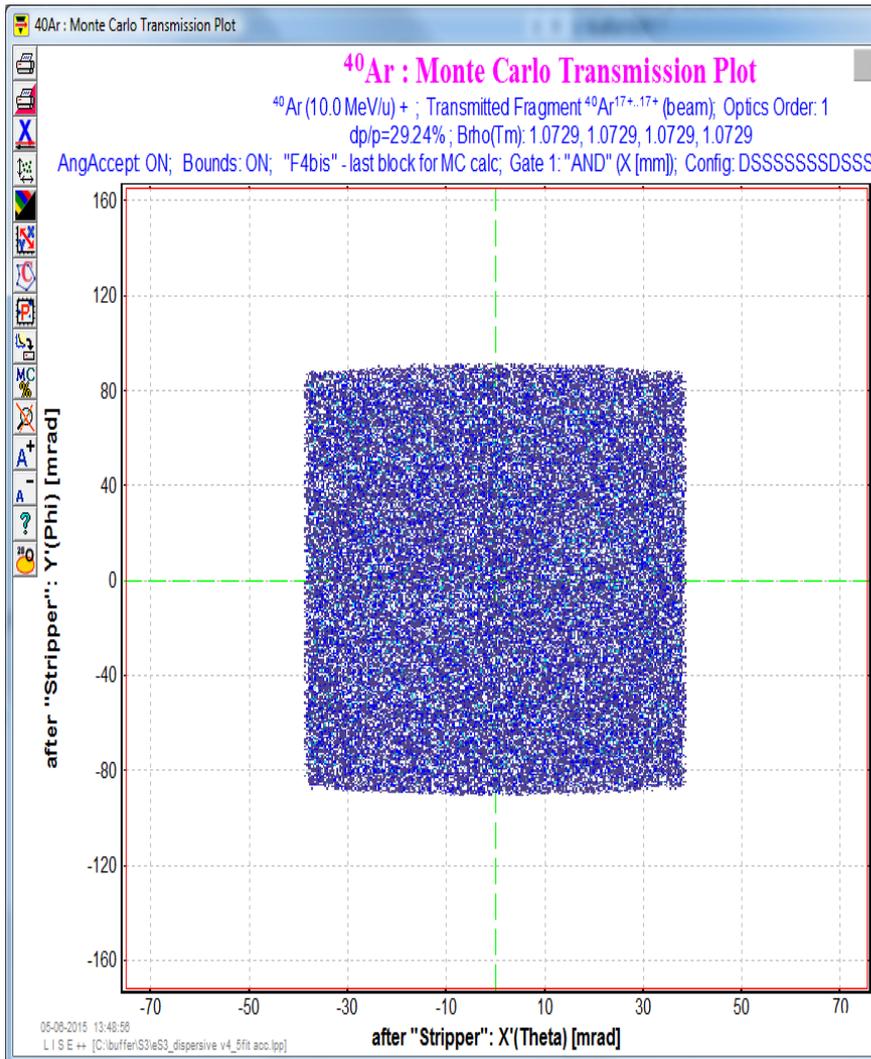
AngAccept: ON; Bounds: Off; "F4bis" - last block for MC calc; no gates; Config: DSSSSSSSDSSSSSS



**Short optimization test only for demonstration!!!**

**1<sup>st</sup> order**

**2<sup>nd</sup> order**



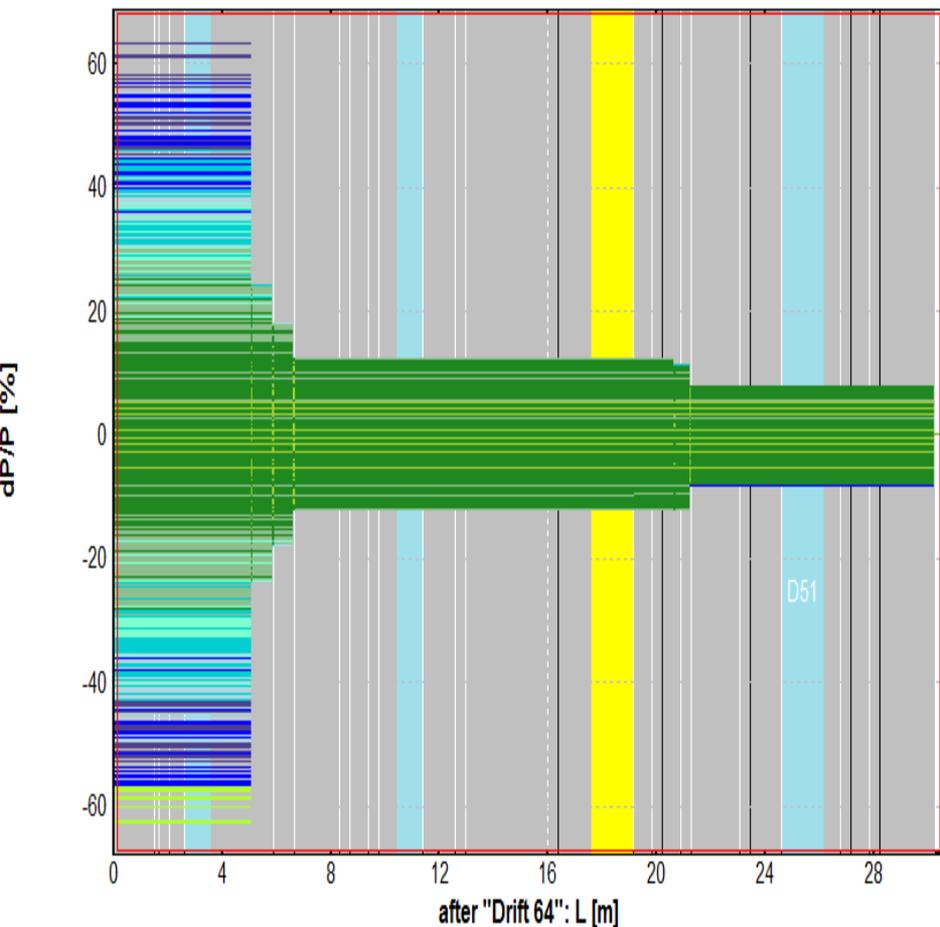
File: eS3\_dispersive v4\_5fit acc.lpp

**Short optimization test only for demonstration!!!**

## <sup>40</sup>Ar : MC Transmission Plot - Envelope (all)

<sup>40</sup>Ar (10.0 MeV/u) + ; Transmitted Fragment <sup>40</sup>Ar<sup>17+..17+</sup> (beam); Optics Order: 1  
 dp/p=29.24% ; Brho(Tm): 1.0729, 1.0729, 1.0729, 1.0729

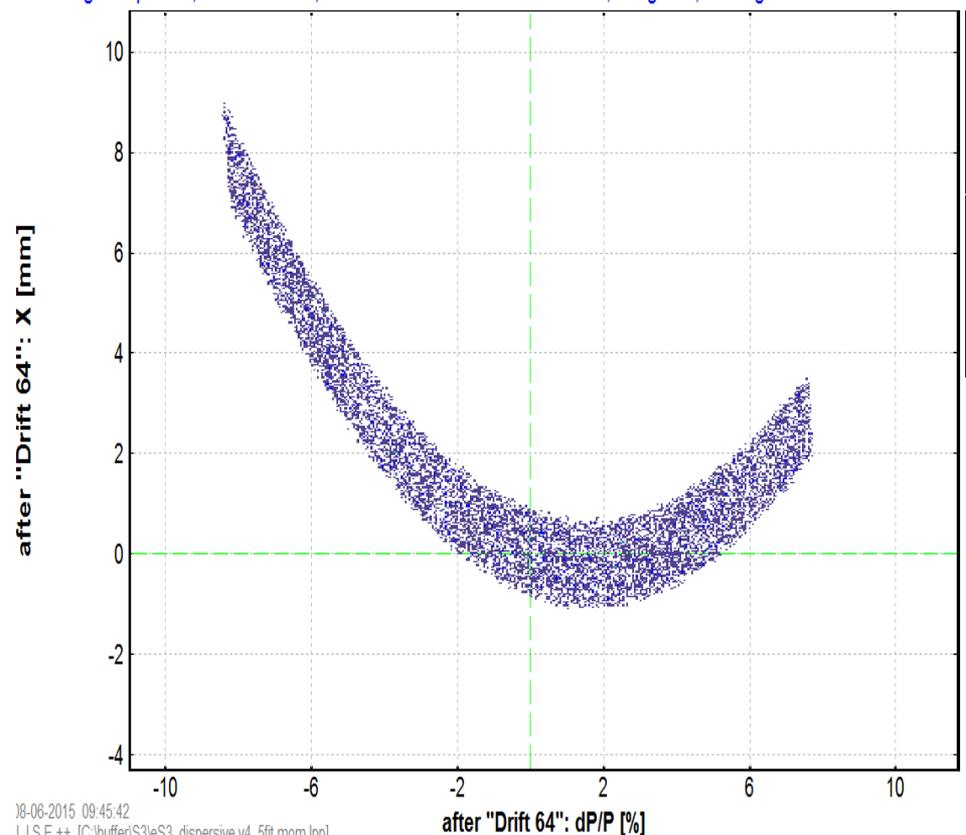
AngAccept: ON; Bounds: ON; "Drift 64" - last block for MC calc; no gates; Config: DSSSSSSDSSSSSS



## <sup>40</sup>Ar : Monte Carlo Transmission Plot

<sup>40</sup>Ar (10.0 MeV/u) + ; Transmitted Fragment <sup>40</sup>Ar<sup>17+..17+</sup> (beam); Optics Order: 1  
 dp/p=29.24% ; Brho(Tm): 1.0729, 1.0729, 1.0729, 1.0729

AngAccept: ON; Bounds: ON; "Drift 64" - last block for MC calc; no gates; Config: DSSSSSSDSSSSSS

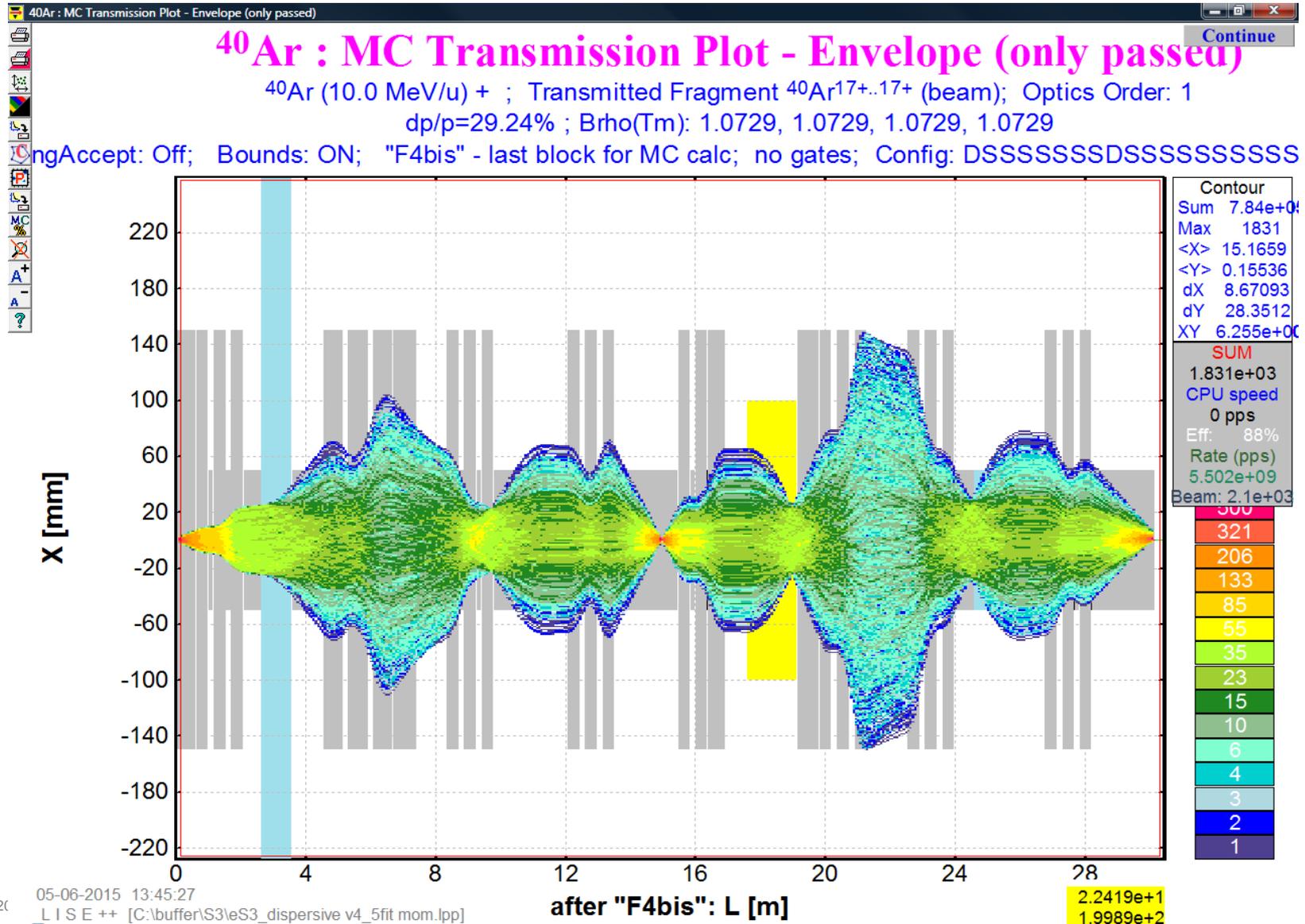


18-06-2015 09:45:42  
 I I S E ++ IC:\buffer\S3\eS3\_dispersive\_v4\_5fit mom.lpp

File : eS3\_dispersive v4\_5fit mom.lpp

Short optimization test only for demonstration!!!

## Main cut @ the triplet after the E-dipole



- **Update of extended configurations**
  - ❖ Based on LISE++ calculations (2<sup>nd</sup> order) -- possibility to optimize
  - ❖ Based on other sophisticated codes – 5 order for aberrations observations
- **Update of user (segmented) configurations**
- **Effective lengths issue is a main key**
- **Multipole calibrations**