

Version 10.1.126

*Discussions with  
Mauricio and Daniel  
are very appreciated*

A1900 settings can be loaded into LISE<sup>++</sup>

- extended &
- segmented

configuration files using

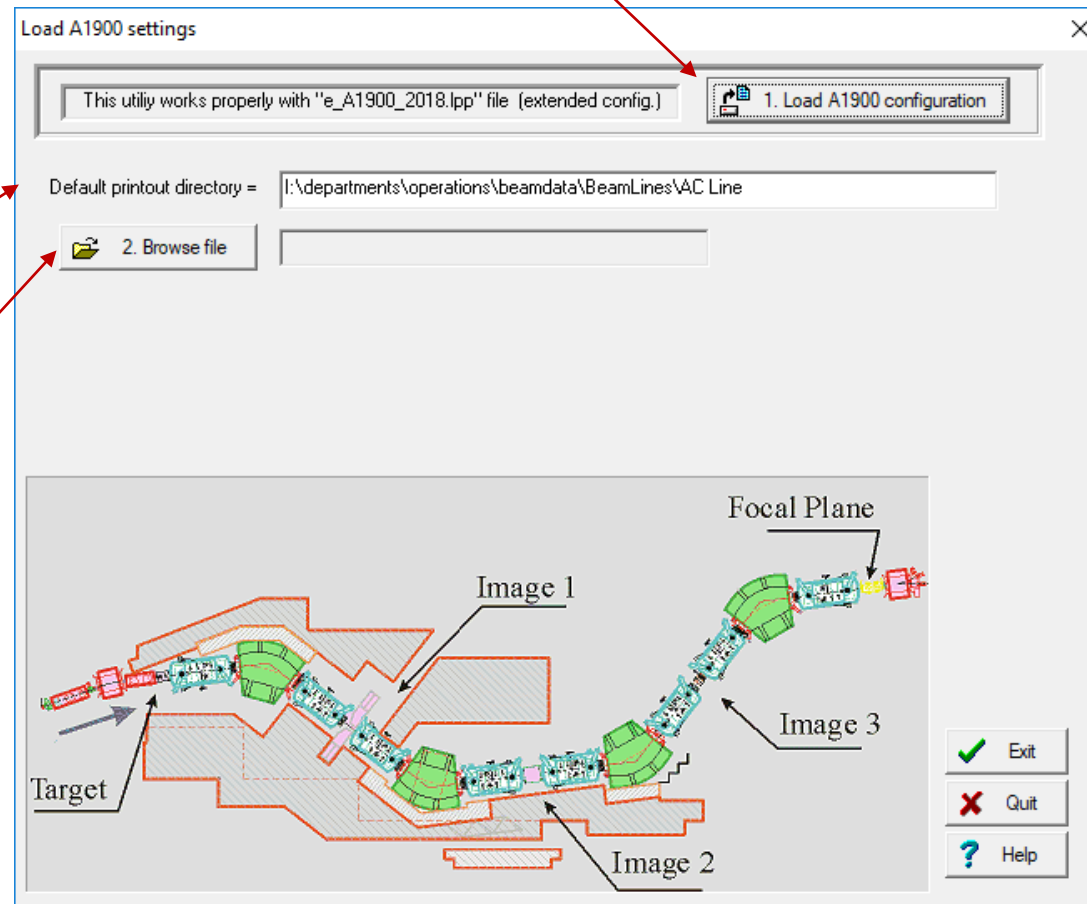
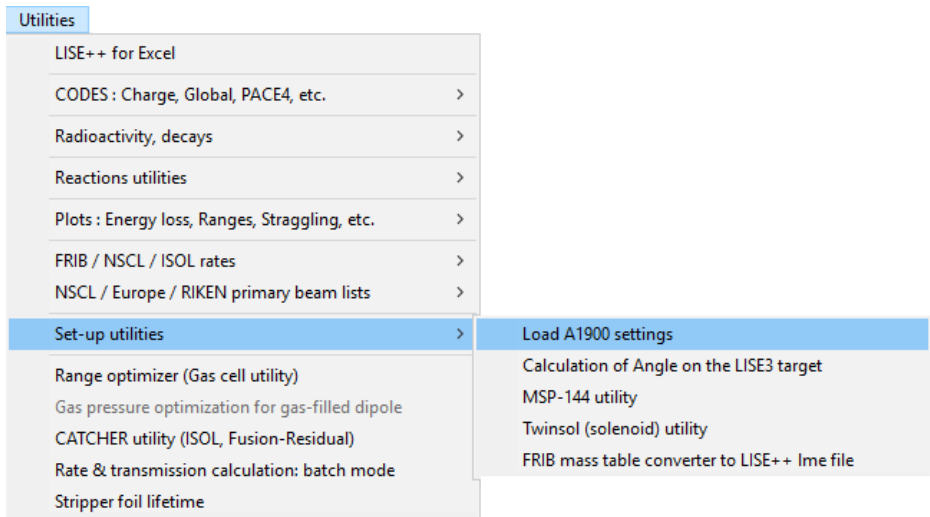
- “Old” (< 10/09/18) &
- “New” (> 10/09/18)

format Barney printout files

- The utility has been designed to work with
- e\_A1900\_2018.lpp (extended) or
  - default A1900\_2016 (segmented) configurations.

The utility uses corresponding of optical block names.  
Do not rename dipole and quadrupole blocks!

Press the **button** to load the extended configuration if you want to work with an extended version.



Make **default** Barney output directory

and press the **“Browse file”** button

# Browse file and view of A1900 settings

**Load A1900 settings**


This utility works properly with "e\_A1900\_2018.lpp" file (extended config.)

1. Load A1900 configuration

Default printout directory = C:\buffer\_LAB\A1900\_settings\txt

2. Browse file  View

3. Read data



Exit Quit Help

C:\buffer\_LAB\A1900\_settings\txt\Print05Feb18\_12h35.txt

A1900 "Print05Feb18\_12h35.txt" Monday 12:35:23 2018-02-05 A1900

Moe\_258 \*\*\* 38K ref to AC233 no degs \*\*\*

Expt: 17012 "Isomer content of K-38 beam" [Chippis, Kelly] Line: h [10]

Beam: 40 Ca 8+ 12.41 MeV/nuc (K500) 20+ 140 MeV/nuc (K1200) Chpr 10 %

<Att 10> ECR. Apertures: SUSI 150.0; 25.0; 15.0 mm SHVBI: 21.3800 kV

K500 a.b: 564 A. 433 A K1200: 688 A. -213 A RF: 23.22390 MHz

A1900 Optics: L19N4AC\_V3.data

Seg	Rigidity	Field	Radius	(live)	Difference	(Field*Radius)
Seg 0:	3.52848 Tm					
Seg 1:	2.78140 Tm	0.90105 T	3.08681 m	3.08686 m	-0.00149 %	(2.78136 Tm)
Seg 2:	2.78140 Tm	0.89958 T	3.09179 m	3.09188 m	-0.00272 %	(2.78132 Tm)
Seg 3:	2.62990 Tm	0.85390 T	3.07968 m	3.07986 m	-0.00582 %	(2.62975 Tm)
Seg 4:	2.62990 Tm	0.85024 T	3.09311 m	3.09314 m	-0.00102 %	(2.62987 Tm)
Seg 5:	2.62990 Tm					
Seg 6:	2.62990 Tm					
Seg 7:	2.62990 Tm					
A116DS		0.83980 T	3.13133 m	3.13158 m	-0.00795 %	
A132DS		-0.81460 T	3.22807 m	3.22846 m	-0.01195 %	
A165DS		-0.79100 T	3.32420 m	3.32478 m	-0.01741 %	
A191DS		-0.00735 T	343.75916 m	357.80952 m	-3.92677 %	
AC219D		0.85398 T	3.07926 m	3.07957 m	-0.01019 %	

Slits: I181 XC.G.YC.G: 76.21, 84.45; -77.36, 84.53

Z001TL: out, Z013TL: out, Z014TL out

Z015TL: Be 987 (5307), Z016TL out; Z015T[mm] 20.42 ( 20.422 rd) pot 0.04 V

Z030BC Beam Stop: 49.85 mm

Z037L.R: -7.97, 8.04 mm or -0.27, 0.27 width= 0.54 %; Z037DC: out

Z057MS: 1.0 pct, Z061MS: 0.5 pct

Z059DC: out, Z062SC: out, Z059TL: A1 150

Z082 XC.G.YG: 0.16, 203.64, 201.94 mm Z082TL: out

Z103DC: out, Z106DC: out, Z107DC U/L: out/out

Z104DC-R -0.006 mm; IRPOS 0; STR1 EJ212 #047 130um pl

Z105TL: out, Slits: ; PPACs: ; Z107 outlim: Y

Z104 XC.G.YC.G: -1.00, 90.00, -1.50, 85.00 mm

A182ANG-R -0.0 deg; A182YTL.RPOS -15.0 mm; -IRPOS = 0; Label OUT

AC206ANG-R -0.0 deg; AC206YTL.RPOS -7.4 mm Y-R= -7.4 mm Label: OUT;

AC206TL.RPOS 0.0 deg; Label: OUT;

AC233ANG-R 0.0 deg; AC233YTL.RPOS 0.0 mm Y-R= 0.0 mm Label: OUT;

AC233TL.RPOS 1.0 deg; Label: VIEWER;

MagName	Ref[kG]	BSet[kG]	Ratio	(live)	Set[A]	Read[A]	DEVI
Z001DV	0.000	-0.634	-17957.90	-17957.90	-275.0000	-274.155	Z001DV
Z002DH	0.000	-0.305	-8657.535	-8657.535	-0.7449	-0.669	read Z002DH
Z003DV	0.000	0.972	27558.18	27558.18	2.3560	2.382	Z003DV
Z004QA	1.685	5.946	1.000000	1.000000	4.1549	4.151	Z004QA
Z005QB	-0.414	-1.461	1.000000	1.000000	-1.0193	-1.013	Z005QB
Z008DS	2.492	9.080	1.032643	1.032643	30.4320	30.581	Z008DS
Z011QA	-2.322	-8.194	1.000000	1.000000	-5.7291	-5.664	Z011QA
Z012QB	3.409	12.029	1.000000	1.000000	8.4629	8.436	Z012QB

Segment 1

Z017TA	3.539	10.458	1.057000	1.057000	27.4211	27.529	Z017TA
Z019TB	-3.322	-9.366	1.010000	1.010000	-24.6476	-24.657	Z019TB
Z021TC	2.407	6.996	1.043000	1.043000	14.6664	14.712	Z021TC
Z026DS	3.226	9.013	1.004226	1.004546	54.7916	54.482	Z026DS
Z031TA	2.926	8.177	1.000000	1.000000	17.1268	17.214	Z031TA
Z033TB	-3.613	-10.092	1.000000	1.000000	-29.1978	-29.234	Z033TB
Z035TC	3.183	8.906	1.000000	1.000000	18.6506	18.740	Z035TC

Segment 2

Z039TA	3.183	8.906	1.000000	1.000000	18.6089	18.679	Z039TA
Z041TB	-3.562	-9.948	1.000000	1.000000	-28.7712	-28.868	Z041TB
Z043TC	2.924	8.172	1.000000	1.000000	17.0609	17.153	Z043TC
Z048DS	-3.226	-8.997	1.002611	1.002734	-57.0685	-57.204	Z048DS
Z053TA	2.800	7.793	1.000000	1.000000	16.3538	16.360	Z053TA

press the "3. Read data" button

default A1900\_2016 (segmented)

e\_A1900\_2018.lpp (extended)

Load A1900 settings

This utility works properly with "e\_A1900\_2018.lpp" file (extended config.) 1. Load A1900 configuration

Default printout directory = C:\buffer\_LAB\A1900\_settings\txt

2. Browse file Print05Feb18\_12h35.txt View

3. Read data

Title  
A1900 "Print05Feb18\_12h35.txt" Monday 12:35:23 2018-02-05 A1900  
Moe\_258 \*\*\*\* 38K ref to AC233 no degs \*\*\*\*  
Expt: 17012 "Isomer content of K-38 beam" [Chipps, Kelly] Line: h [10]

4. Load values in the code & Calculate matrices

Values	use	Values	use
Projectile = 40Ca20+	<input checked="" type="checkbox"/>	Dipole fields = N = 4	<input type="checkbox"/>
Energy [title] (MeV/u) = 140	<input checked="" type="checkbox"/>	<b>Quadrupole fields = N = 0(0)</b>	<input type="checkbox"/>
Energy [Seg0] (MeV/u) = 140	<input type="checkbox"/>	Use A1900 Quadrupole fudging factors	<input checked="" type="checkbox"/>
RF (MHZ) = 23.2239	<input checked="" type="checkbox"/>	Manual additional quadrupole field factor = 0.9707	<input checked="" type="checkbox"/>
Target [Z13] = out	<input checked="" type="checkbox"/>	<b>Sextupole fields = N = 0</b>	<input type="checkbox"/>
Target [Z14] = out	<input checked="" type="checkbox"/>	11-slits [Z37] = -8.0 : +8.0	<input type="checkbox"/>
Target [Z15] = Be 987.0	<input checked="" type="checkbox"/>	12-slits [Z57,Z61] = -14.8 : +14.8	<input type="checkbox"/>
Target [Z16] = out	<input checked="" type="checkbox"/>	FP-slits [Z104] = -46.0 : +44.0	<input type="checkbox"/>
wedge [Z59] = Al 150.0	<input checked="" type="checkbox"/>		

Exit Quit Help

Load A1900 settings

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4. Load values in the code & Calculate matrices

Values	use	Values	use
Projectile = 40Ca20+	<input checked="" type="checkbox"/>	Dipole fields = N = 4	<input type="checkbox"/>
Energy [title] (MeV/u) = 148	<input checked="" type="checkbox"/>	<b>Quadrupole fields = N = 24(24)</b>	<input type="checkbox"/>
Energy [Seg0] (MeV/u) = 140	<input type="checkbox"/>	Use A1900 Quadrupole fudging factors	<input checked="" type="checkbox"/>
RF (MHZ) = 23.2239	<input checked="" type="checkbox"/>	Manual additional quadrupole field factor = 0.9707	<input checked="" type="checkbox"/>
Target [Z13] = out	<input checked="" type="checkbox"/>	<b>Sextupole fields = N = 16</b>	<input type="checkbox"/>
Target [Z14] = out	<input checked="" type="checkbox"/>	11-slits [Z37] = -8.0 : +8.0	<input type="checkbox"/>
Target [Z15] = Be 987.0	<input checked="" type="checkbox"/>	12-slits [Z57,Z61] = -14.8 : +14.8	<input type="checkbox"/>
Target [Z16] = out	<input checked="" type="checkbox"/>	FP-slits [Z104] = -46.0 : +44.0	<input type="checkbox"/>
wedge [Z59] = Al 150.0	<input checked="" type="checkbox"/>		

Exit Quit Help

Difference between configurations

Load A1900 settings

This utility works properly with "e\_A1900\_2018.lpp" file (extended config.)

1. Load A1900 configuration

Default printout directory = C:\buffer\_LAB\A1900\_settings\

2. Browse file

Print05Feb18\_12h35.txt View

3. Read data

Title  
A1900 "Print05Feb18\_12h35.txt" Monday 12:35:23 2018-02-05 A1900  
Moe\_258 \*\*\*\* 38K ref to AC233 no degs \*\*\*\*  
Expt: 17012 "Isomer content of K-38 beam" [Chipps, Kelly] Line: h [10]

4. Load values in the code & Calculate matrices

	Values	use		Values	use
Projectile =	40Ca20+	<input checked="" type="checkbox"/>	Dipole fields =	N = 4	<input checked="" type="checkbox"/>
Energy [title] (MeV/u) =	140	<input checked="" type="checkbox"/>	Quadrupole fields =	N = 24(24)	<input checked="" type="checkbox"/>
Energy [Seg0] (MeV/u) =	140	<input type="checkbox"/>	Use A1900 Quadrupole fudging factors		<input checked="" type="checkbox"/>
RF (MHZ) =	23.2239	<input checked="" type="checkbox"/>	Manual additional quadrupole field factor = (default 0.97021)	0.9707	<input checked="" type="checkbox"/>
Target [Z13] =	out	<input type="checkbox"/>	Sextupole fields =	N = 16	<input checked="" type="checkbox"/>
Target [Z14] =	out	<input type="checkbox"/>	11-slits [Z37] =	-8.0 : +8.0	<input checked="" type="checkbox"/>
Target [Z15] =	Be 987.0	<input checked="" type="checkbox"/>	12-slits [Z57,Z61] =	-14.8 : +14.8	<input checked="" type="checkbox"/>
Target [Z16] =	out	<input type="checkbox"/>	FP-slits [Z104] =	-46.0 : +44.0	<input checked="" type="checkbox"/>
wedge [Z59] =	Al 150.0	<input checked="" type="checkbox"/>			

Exit Quit Help

This value is absent in the new format printout

Only one target will be downloaded in the code

24 quadrupoles from 24 in the configuration were read correctly

Minimum of Z057MS and Z061MS will be taken

press the "4. Load values into the code & Calculate matrices" button

**Load A1900 settings**

This utility works properly with "e\_A1900\_2018.lpp" file (extended config.) 1. Load A1900 configuration

Default printout directory = C:\buffer\_LAB\A1900\_settings\txt

2. Browse file Print05Feb18\_12h35.txt View

3. Read data

Title  
A1900 "Print05Feb18\_12h35.txt" Monday 12:35:23 2018-02-05 A1900  
Moe\_258 \*\*\*\* 38K ref to AC233 no degs \*\*\*\*  
Expt: 17012 "Isomer content of K-38 beam" [Chipps, Kelly] Line: h [10]

**4. Load values in the code & Calculate matrices**

<table border="0"> <tr><td>Projectile =</td><td>40Ca20+</td><td><input checked="" type="checkbox"/></td></tr> <tr><td>Energy [title] (MeV/u) =</td><td>140</td><td><input checked="" type="checkbox"/></td></tr> <tr><td>Energy [Seg0] (MeV/u) =</td><td>140</td><td><input type="checkbox"/></td></tr> <tr><td>RF (MHZ) =</td><td>23.2239</td><td><input checked="" type="checkbox"/></td></tr> <tr><td>Target [Z13] =</td><td>out</td><td><input type="checkbox"/></td></tr> <tr><td>Target [Z14] =</td><td>out</td><td><input type="checkbox"/></td></tr> <tr><td>Target [Z15] =</td><td>Be 987.0</td><td><input checked="" type="checkbox"/></td></tr> <tr><td>Target [Z16] =</td><td>out</td><td><input type="checkbox"/></td></tr> <tr><td>wedge [Z59] =</td><td>Al 150.0</td><td><input checked="" type="checkbox"/></td></tr> </table>	Projectile =	40Ca20+	<input checked="" type="checkbox"/>	Energy [title] (MeV/u) =	140	<input checked="" type="checkbox"/>	Energy [Seg0] (MeV/u) =	140	<input type="checkbox"/>	RF (MHZ) =	23.2239	<input checked="" type="checkbox"/>	Target [Z13] =	out	<input type="checkbox"/>	Target [Z14] =	out	<input type="checkbox"/>	Target [Z15] =	Be 987.0	<input checked="" type="checkbox"/>	Target [Z16] =	out	<input type="checkbox"/>	wedge [Z59] =	Al 150.0	<input checked="" type="checkbox"/>	<table border="0"> <tr><td>Dipole fields =</td><td>N = 4</td><td><input checked="" type="checkbox"/></td></tr> <tr><td>Quadrupole fields =</td><td>N = 24(24)</td><td><input checked="" type="checkbox"/></td></tr> <tr><td>Use A1900 Quadrupole fudging factors</td><td></td><td><input checked="" type="checkbox"/></td></tr> <tr><td>Manual additional quadrupole field factor = (default 0.9702)</td><td>0.9707</td><td><input checked="" type="checkbox"/></td></tr> <tr><td>Sextupole fields =</td><td>N = 16</td><td><input checked="" type="checkbox"/></td></tr> <tr><td>l1-slits [Z37] =</td><td>-8.0 : +8.0</td><td><input checked="" type="checkbox"/></td></tr> <tr><td>l2-slits [Z57,Z61] =</td><td>-14.8 : +14.8</td><td><input checked="" type="checkbox"/></td></tr> <tr><td>FP-slits [Z104] =</td><td>-46.0 : +44.0</td><td><input checked="" type="checkbox"/></td></tr> </table>	Dipole fields =	N = 4	<input checked="" type="checkbox"/>	Quadrupole fields =	N = 24(24)	<input checked="" type="checkbox"/>	Use A1900 Quadrupole fudging factors		<input checked="" type="checkbox"/>	Manual additional quadrupole field factor = (default 0.9702)	0.9707	<input checked="" type="checkbox"/>	Sextupole fields =	N = 16	<input checked="" type="checkbox"/>	l1-slits [Z37] =	-8.0 : +8.0	<input checked="" type="checkbox"/>	l2-slits [Z57,Z61] =	-14.8 : +14.8	<input checked="" type="checkbox"/>	FP-slits [Z104] =	-46.0 : +44.0	<input checked="" type="checkbox"/>
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Please check next settings:

- \* Beam energy,
- \* Setting Fragment,
- \* Target thickness,
- \* Wedge thickness

LISE++ automatically proposes you to save the modified file. Please, do not overwrite the original e\_A1900\_LISE\_2018.lpp file

**Save As**

Save in: NSCL

Name	Date modified
D-line	10/18/2018 12:24
40ar_32mg_a1900s800d0	4/16/2012 10:50 PM
AF_238U_Be_NSCL	4/16/2012 10:57 PM
e_A1900_COSY	4/16/2012 10:53 PM
e_A1900_I190_LISE	4/16/2012 10:55 PM

File name: e\_A1900\_LISE\_2018 Save

Save as type: LISE++ files (\*.lpp) Cancel

Important!

Matrices are recalculated by LISE++ based on the TRANSPORT approach using dipole and quad settings of e\_A1900\_LISE\_2018.lpp file

# Results

default A1900\_2016 (segmented)

<b>P</b>	projectile	$^{40}\text{Ca}^{20+}$
	140 MeV/u	1000 enA
<b>F</b>	fragment	$^1\text{H}^{1+}$
<b>T</b>	Target	$^9\text{Be}$ 987 $\mu\text{g}/\text{cm}^2$
<b>Str</b>	Stripper	
<b>D</b>	D1	Brho 2.7814 Tm
<b>S</b>	I1_slits	slits -8 H +8
<b>D</b>	D2	Brho 2.7814 Tm
<b>S</b>	I2_slits	slits -14.8 H +14.8
<b>W</b>	I2_wedge	Al 150 $\mu\text{g}/\text{cm}^2$
<b>D</b>	D3	Brho 2.6289 Tm
<b>D</b>	D4	Brho 2.6289 Tm
<b>M</b>	FP_PPAC0	Al 2 $\mu\text{g}/\text{cm}^2$
<b>M</b>	FP_PPAC1	Al 2 $\mu\text{g}/\text{cm}^2$
<b>S</b>	FP_slits	slits -46 H +44 -25 V +25
<b>M</b>	FP_PIN	Si 504 $\mu\text{m}$
<b>M</b>	FP_SCI	C9H10 100 nm
config: A1900_2016		dpip
option: A1900_2009		0.5%
version: 10.1.128		total

Set manually a fragment of interest

e\_A1900\_2018.lpp (extended)

<b>P</b>	projectile	$^{40}\text{Ca}^{20+}$
	140 MeV/u	1000 enA
<b>F</b>	fragment	$^1\text{H}^{1+}$
<b>T</b>	Target	$^9\text{Be}$ 987 $\mu\text{g}/\text{cm}^2$
<b>Str</b>	Stripper	
<b>D</b>	tuning12	Brho 2.7814 Tm
<b>d</b>	z015	standard 39.6 cm
<b>Q</b>	Q017TA	QUAD 8.6041 kG
<b>d</b>	z018	standard 17.56 cm
<b>Q</b>	Q019TB	QUAD -9.0016 kG
<b>d</b>	z020	standard 17.2 cm
<b>Q</b>	Q021TC	QUAD 6.511 kG
<b>d</b>	z022	standard 2.7814 Tm
<b>D</b>	D1	Brho 2.7814 Tm
<b>d</b>	z030	standard 58.4 cm
<b>Q</b>	Q031TA	MULT 7.9374 kG
<b>d</b>	z032	standard 13.58 cm
<b>Q</b>	Q033TB	MULT -9.7963 kG
<b>d</b>	z034	standard 13.58 cm
<b>Q</b>	Q035TC	QUAD 8.6451 kG
<b>d</b>	z036	standard 58.6 cm
<b>S</b>	Image1(037)	slits -8 H +8 -100 V +100
<b>d</b>	z038	standard 58.6 cm
<b>Q</b>	Q039TA	QUAD 8.6451 kG





Only for e\_A1900\_2018.lpp (extended) configuration

C:\buffer\_LAB\A1900\_settings\txt\Print05Feb18\_12h35.txt

Segment 1							
Z017TA	3.539	10.458	1.057000	1.057000	27.4274	27.529	Z017TA
Z019TB	-3.322	-9.366	1.010000	1.010000	-24.6776	-24.657	Z019TB
Z021TC	2.407	6.996	1.043000	1.043000	14.6664	14.712	Z021TC
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Z039TA	3.183	8.906	1.000000	1.000000	18.6089	18.679	Z039TA
Z041TB	-3.562	-9.948	1.000000	1.000000	-28.7712	-28.868	Z041TB
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Z048DS	-3.226	-8.997	1.002611	1.002734	-57.0685	-57.204	Z048DS
Z053TA	2.800	7.793	1.000000	1.000000	16.3538	16.360	Z053TA
Z053TA	2.800	7.793	1.000000	1.000000	16.3538	16.360	Z053TA
Z055TB	-3.665	-10.262	1.000000	1.000000	-27.6861	-27.647	Z055TB
Z057TC	3.264	9.313	1.000000	1.000000	90.3132	90.146	Z057TC
Segment 3							
Z062TA	3.264	8.786	1.000000	1.000000	85.0696	84.927	Z062TA
Z064TB	-3.665	-9.695	1.000000	1.000000	-26.1368	-26.122	Z064TB
Z066TC	2.800	7.367	1.000000	1.000000	15.4285	15.444	Z066TC
Z071DS	-3.226	-8.540	1.006672	1.006672	-52.3338	-52.492	Z071DS
Z076TA	2.924	7.723	1.000000	1.000000	16.2147	16.299	Z076TA
Z078TB	-3.562	-9.401	1.000000	1.000000	-27.2310	-27.098	Z078TB
Z080TC	3.183	8.414	1.000000	1.000000	17.6110	17.641	Z080TC
Segment 4							
Z084TA	3.097	8.340	1.019000	1.019000	17.4807	17.519	Z084TA
Z086TB	-3.403	-8.927	0.994000	0.994000	-25.8626	-25.755	Z086TB
Z088TC	2.767	7.439	1.018000	1.018000	15.5501	15.566	Z088TC
Z093DS	3.226	8.502	1.002153	1.002153	51.7807	51.735	Z093DS
Z098TA	2.501	6.490	0.978000	0.978000	13.5675	13.491	Z098TA
Z100TB	-3.039	-7.742	0.965000	0.965000	-20.3658	-20.384	Z100TB
Z102TC	1.454	3.435	0.903000	0.903000	9.0266	9.035	Z102TC

*This is recommended to mark it*

Load A1900 settings

This utility works properly with "e\_A1900\_2018.lpp" file (extended config.) 1. Load A1900 configuration

Default printout directory = C:\buffer\_LAB\A1900\_settings\txt

2. Browse file Print05Feb18\_12h35.txt View

3. Read data

Title: A1900 "Print05Feb18\_12h35.txt" Monday 12:35:23 2018-02-05 A1900  
 Moe\_258 \*\*\*\* 38K ref to AC233 no degs \*\*\*\*  
 Expt: 17012 "Isomer content of K-38 beam" [Chippis, Kelly] Line: h [10]

4. Load values in the code & Calculate matrices

Projectile = <input type="text" value="40Ca20+"/> <input checked="" type="checkbox"/> use	Dipole fields = <input type="text" value="N = 4"/> <input checked="" type="checkbox"/> use	Please check next settings: * Beam energy, * Setting Fragment, * Target thickness, * Wedge thickness
Energy [title] (MeV/u) = <input type="text" value="140"/> <input checked="" type="checkbox"/> use	Quadrupole fields = <input type="text" value="N = 0(0)"/> <input checked="" type="checkbox"/> use	
Energy [Seg0] (MeV/u) = <input type="text" value="140"/> <input type="checkbox"/> use	<input checked="" type="checkbox"/> Use A1900 Quadrupole fudging factors <input checked="" type="checkbox"/> use	
RF (MHZ) = <input type="text" value="23.2239"/> <input checked="" type="checkbox"/> use	Manual additional quadrupole field factor = <input type="text" value="0.9707"/> <input type="checkbox"/> use (default 0.9702)	
Target [Z13] = <input type="text" value="out"/> <input type="checkbox"/> use	Sextupole fields = <input type="text" value="N = 0"/> <input checked="" type="checkbox"/> use	
Target [Z14] = <input type="text" value="out"/> <input type="checkbox"/> use	l1-slits [Z37] = <input type="text" value="-8.0: +8.0"/> <input checked="" type="checkbox"/> use	
Target [Z15] = <input type="text" value="Be 987.0"/> <input checked="" type="checkbox"/> use	l2-slits [Z57,Z61] = <input type="text" value="-14.8: +14.8"/> <input checked="" type="checkbox"/> use	
Target [Z16] = <input type="text" value="out"/> <input type="checkbox"/> use	FP-slits [Z104] = <input type="text" value="-46.0: +44.0"/> <input checked="" type="checkbox"/> use	
wedge [Z59] = <input type="text" value="Al 150.0"/> <input checked="" type="checkbox"/> use		

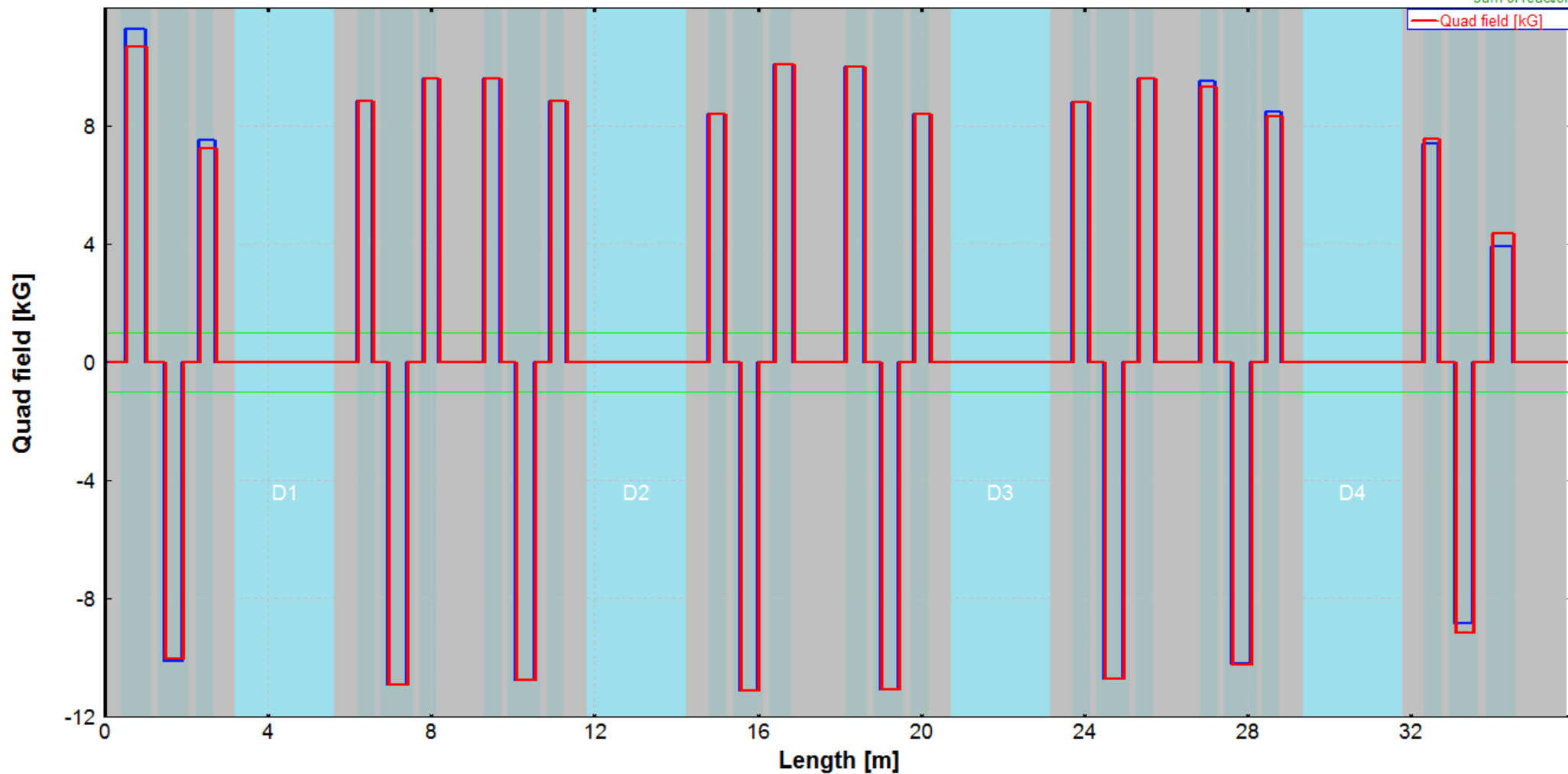
## Quadrupole field strengths

blue: A1900 original

red: A1900 with fudging

$^1\text{H}$  (358.82 MeV/u); Settings on  $^1\text{H}$ ; Config: DSSSFSSSFDFSSSSSSFFFFFSS...  
 $dp/p=5.26\%$ ; Wedges: 0; Brho(Tm): 3.0000, 3.0000, 3.0000, 3.0000, 3.0000....

without charge states  
sum of reactions

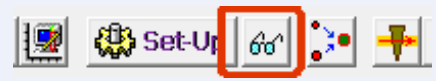


# New option "Quadrupole field strengths" plot

Experiment Settings

- Projectile
- Target
- Stripper after Target
- Spectrometer Design
- Optics**
  - Tune spectrometer for setting fragment on beam axis
  - Tune spectrometer for setting fragment at middle of slit
  - OPTIMIZATION (optical element parameters fitting)
  - Manual recalculation of e-blocks matrices (only for Experts!)
  - Update matrices linked with COSY files
  - Envelope plot
  - First order matrix elements : Plot
  - First order matrix elements : View & Print
  - Optics settings : FAST EDITING**
  - Optics settings : View & Print
  - Brho(Erho) Analyzer
  - The First- and Second-Order Matrix Elements for an Ideal Magnet
- Gamma registration
- Setting Fragment
- Tune spectrometer for the primary beam

Or using the icon



Envelope of First order matrix elements

Components

X, X'

Y, Y'

X, X' & Y, Y'

Add "L" row

Matrices

Global

Local

Global & Local

Show

only Diagonal elements (AA', BB')

only Off-Diagonal elements (AB', BA')

all elements

Dimension

mm / mrad

cm / mrad

Quadrupole field strengths plot  Make it default

Optics settings (fast editing)

Block	Given Name	Start(m)	Length(m)	B0(kG)*U	B(Tm)cor/real	Drift(M)/Angle	Rapp(cm)/R(m)	Leff(m)/Ldip(m)	2 nd order	CalcMatr/Z-Q	AngAcc.Apps.Slits	COSY   Fit	SE
Dipole	tuning12	0.000	0.0000	+10.0000	* 3.0000	* +0.0	* 3.0000	* 0.0000	--	* 0	-- --	-	E
drift	z015	0.000	0.3960	.....	.....	standard	.....	.....	.....	.....	-- HV --	-	e
<Quad>	Q017TA	0.396	0.7480	+10.4758	3.0000	QUAD	13.3000	0.7480	yes	1 R	-- HV --	fit - Q	e
drift	z018	1.144	0.1756	.....	.....	standard	.....	.....	.....	.....	-- HV --	-	e
<Quad>	Q019TB	1.320	0.7480	-9.7677	3.0000	QUAD	13.3000	0.7480	yes	1 R	-- HV --	fit - Q	e
Fit	Fit z19R	2.068	0.0000	.....	.....	.....	.....	.....	.....	.....	.....	s R < 100	e
drift	z020	2.068	0.1720	.....	.....	standard	.....	.....	.....	.....	-- HV --	-	e
<Quad>	Q021TC	2.240	0.4300	+7.0570	3.0000	QUAD	15.0000	0.4300	yes	1 R	-- HV --	fit - Q	e
drift	z022	2.670	0.5260	.....	.....	standard	.....	.....	.....	.....	-- HV --	-	e
Fit	D1-Y	3.196	0.0000	.....	.....	.....	.....	.....	.....	.....	.....	s Y < 45	e
Dipole	D1	3.196	2.4299	+9.6965	* 3.0000	* +45.0	* 3.0939	* 2.4299	yes	* 0 R	-- HV --	-	E
Fit	D1-X	5.626	0.0000	.....	.....	.....	.....	.....	.....	.....	.....	s X < 100	e
drift	z030	5.626	0.5640	.....	.....	standard	.....	.....	.....	.....	-- HV --	-	e
<Quad>	Q031TA	6.190	0.4300	+8.5903	3.0000	MULT	15.0000	0.4300	yes	1 R	-- HV --	fit - Q	e
drift	z032	6.620	0.1358	.....	.....	standard	.....	.....	.....	.....	-- HV --	-	e
<Quad>	Q033TB	6.755	0.8120	-10.5847	3.0000	MULT	15.0000	0.8120	yes	1 R	-- HV --	fit - Q	e
drift	z034	7.567	0.1358	.....	.....	standard	.....	.....	.....	.....	-- HV --	-	e
<Quad>	Q035TC	7.703	0.4300	+9.3041	3.0000	QUAD	15.0000	0.4300	yes	1 R	-- HV --	fit - Q	e
drift	z036	8.133	0.5860	.....	.....	standard	.....	.....	.....	.....	-- HV --	-	e
Fit	I1-focX	8.719	0.0000	.....	.....	.....	.....	.....	.....	.....	.....	R12 = 0	e
Fit	I1-focY	8.719	0.0000	.....	.....	.....	.....	.....	.....	.....	.....	R34 = 0	e
Fit	I1-AD	8.719	0.0000	.....	.....	.....	.....	.....	.....	.....	.....	R26 = 0	e
Fit	I1-XX	8.719	0.0000	.....	.....	.....	.....	.....	.....	.....	.....	// R11 = -2....	no

Selected block

Dispersive (M-dipole)

Block name: tuning12

Block Length [m]: 0.00001

Length after this block [m]: 0

Charge State [Z-Q]: 0

Selected Block Edit

Multipole Edit

Cuts (Acceptances)

Optical Matrix

Angular acceptance (mrad)

Horizontal ±: [ ] [ ] Use

Vertical ±: [ ] [ ] Use

Shape: Rectangle  Ellipse

Inside Aperture (mm)

X = min: -50 max: 50 Use

Y = min: -50 max: 50 Use

Shape: Rectangle  Ellipse

Slits (mm) after this BLOCK

X = min: [ ] max: [ ] Use

Y = min: [ ] max: [ ] Use

Shape: Rectangle  Ellipse

First order Matrix Elements

Matrix Plot

Beam-Sigma Plot

View

Quit Help

I:\departments\operations\beamdata\BeamLines\G Line

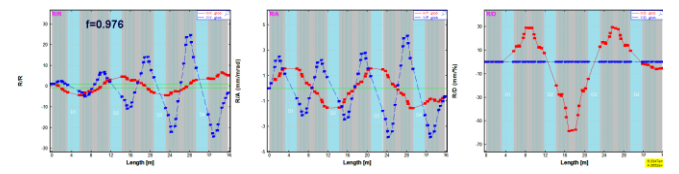
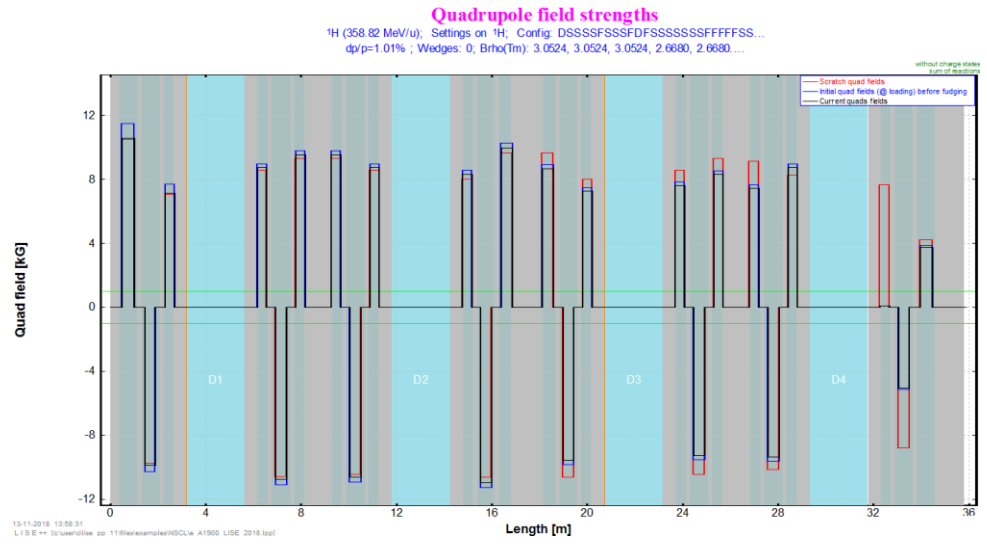
Print15Mar05\_13h23.txt View

Title  
A1900 "Print15Mar05\_13h23.txt" Tuesday 13:23:08 2005-03-15 A1900

\*\*\* 57Cu to G157 +0.5pct, +2deg \*\*\*

Expt: 02001 "Magnetic moment of Cu-57" [Theo Mertziakis] Line: RPMS [6]

2005



Print31Jan18\_16h08.txt

Title  
A1900 "Print31Jan18\_16h08.txt" Wednesday 16:08:48 2018-01-31 A1900

Moe\_258 \*\*\* Se-71 to AC233 (prelim) \*\*\*

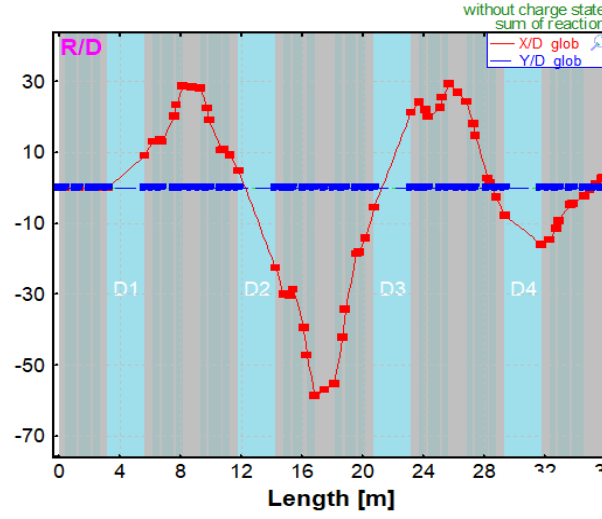
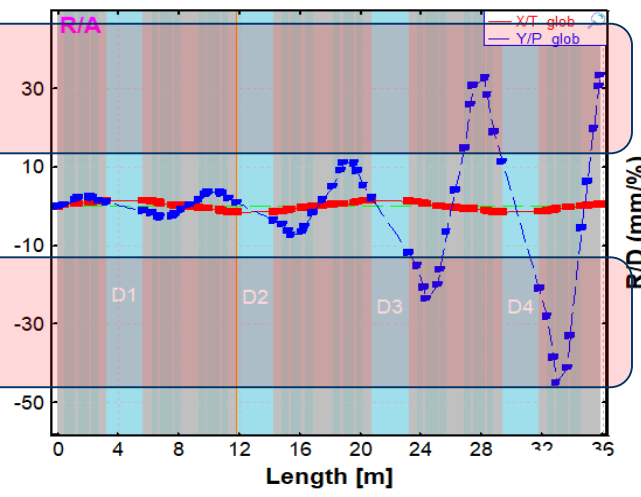
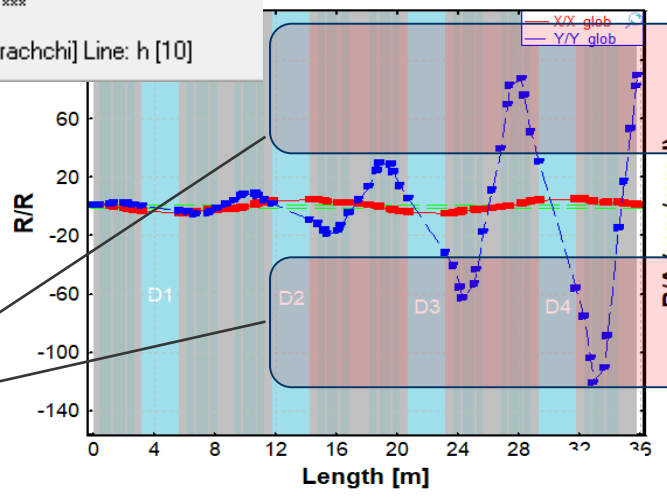
Expt: 00338 "Gas Cell Equipment Test" [Sumithrarachchi] Line: h [10]

2018

File is not acceptable for future use

### First order matrix elements

<sup>78</sup>Kr (150 MeV/u) + Be (94 mg/cm<sup>2</sup>); Settings on <sup>1</sup>H; Config: DSSSFSSSFDFSSSSSSSSFFSS...  
dp/p=0.52%; Wedges: Al (300 mg/cm<sup>2</sup>); Brho(Tm): 3.6255, 3.6255, 3.6255, 3.2829, 3.2829...

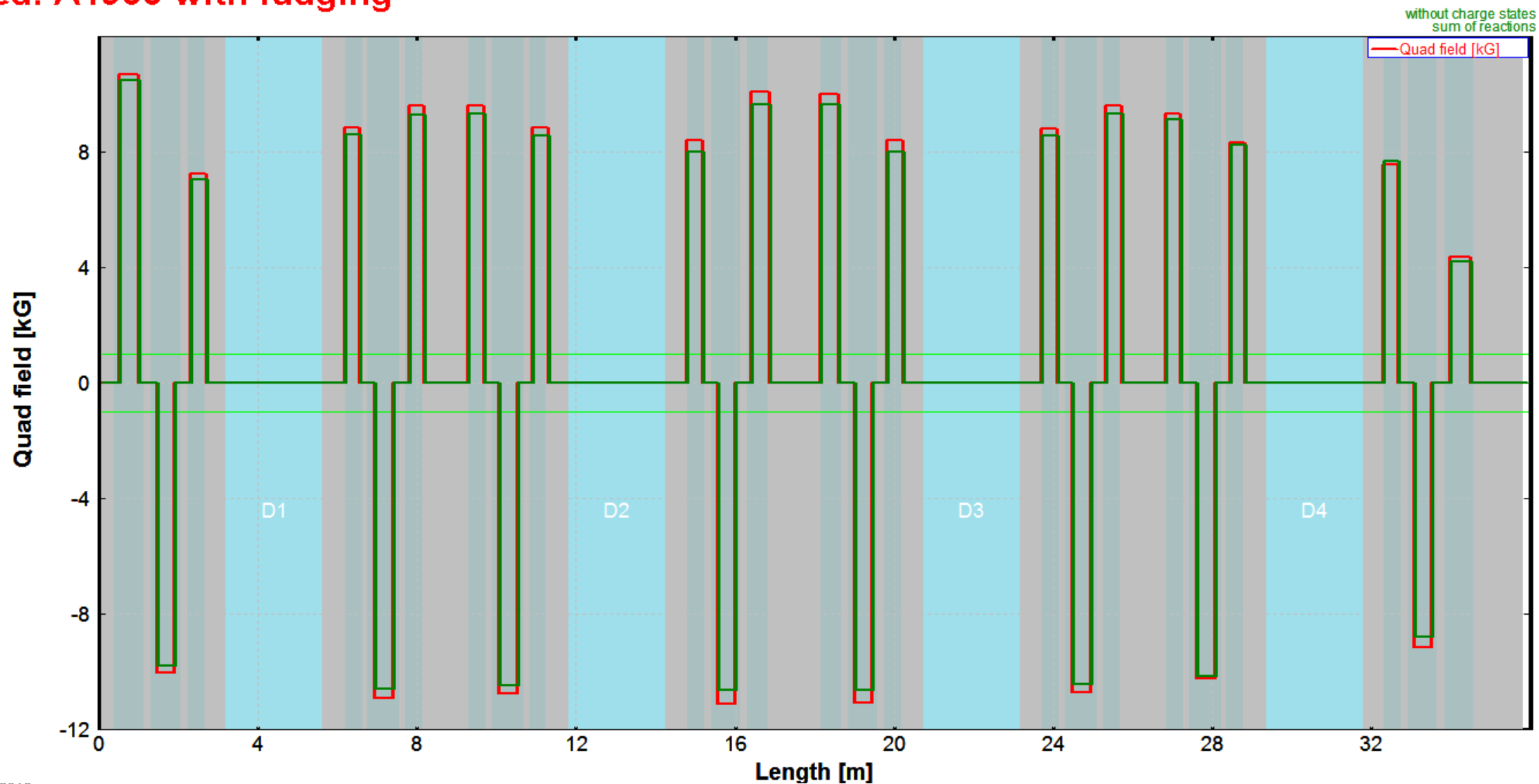


green: LISE

red: A1900 with fudging

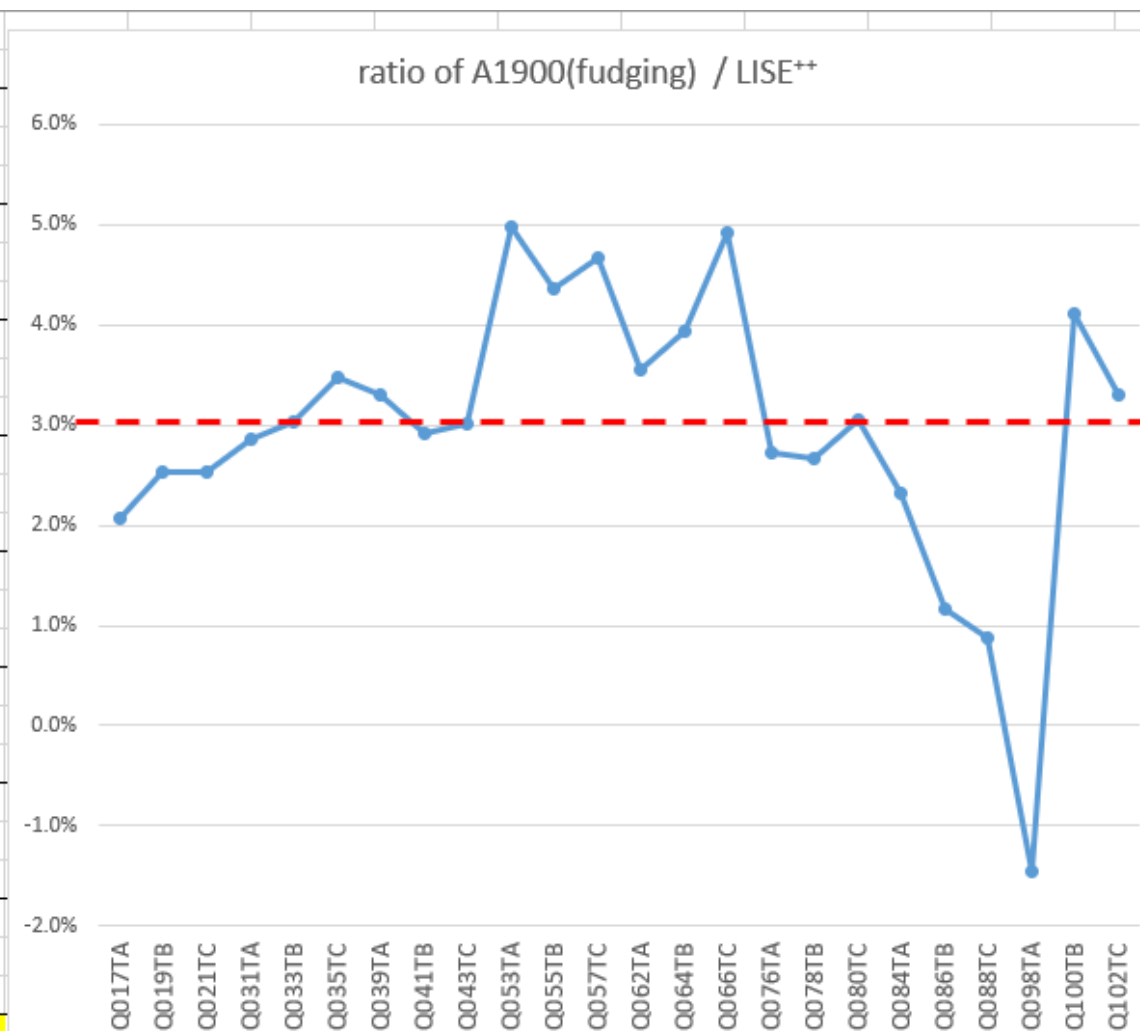
## Quadrupole field strengths

<sup>1</sup>H (358.82 MeV/u); Settings on <sup>1</sup>H; Config: DSSSFSSSFDFSSSSSSFFSS...  
 dp/p=5.26% ; Wedges: 0; Brho(Tm): 3.0000, 3.0000, 3.0000, 3.0000, 3.0000...



# 2018 quad fields: A1900 (fudging) versus LISE<sup>++</sup> (Transport)

Block name	(m) Length	R(m)* Rapp(cm)	NO fudging B0(kG)	Fudging B0(kG)	LISE B0(kG)	Fudging/LISE -1 ratio	LISE/Fudging ratio	
Q017TA	0.748	13.3	11.302	10.692	10.476	2.1%	0.9798	
Q019TB	0.748	13.3	-10.115	-10.015	-9.768	2.5%	0.9753	
Q021TC	0.43	15	7.547	7.236	7.057	2.5%	0.9753	
Q031TA	0.43	15	8.835	8.835	8.59	2.9%	0.9723	
Q033TB	0.812	15	-10.906	-10.906	-10.585	3.0%	0.9706	
Q035TC	0.43	15	9.628	9.628	9.304	3.5%	0.9663	
Q039TA	0.43	15	9.628	9.628	9.32	3.3%	0.9680	
Q041TB	0.812	15	-10.749	-10.749	-10.445	2.9%	0.9717	
Q043TC	0.43	15	8.831	8.831	8.573	3.0%	0.9708	
Q053TA	0.43	15	8.408	8.408	8.009	5.0%	0.9525	
Q055TB	0.732	15	-11.097	-11.097	-10.634	4.4%	0.9583	
Q057TC	0.526	21	10.106	10.106	9.655	4.7%	0.9554	
Q062TA	0.526	21	10.005	10.005	9.661	3.6%	0.9656	
Q064TB	0.732	15	-11.054	-11.054	-10.636	3.9%	0.9622	
Q066TC	0.43	15	8.403	8.403	8.009	4.9%	0.9531	
Q076TA	0.43	15	8.807	8.807	8.573	2.7%	0.9734	
Q078TB	0.812	15	-10.72	-10.72	-10.442	2.7%	0.9741	
Q080TC	0.43	15	9.595	9.595	9.31	3.1%	0.9703	
Q084TA	0.43	15	9.51	9.333	9.122	2.3%	0.9774	
Q086TB	0.812	15	-10.181	-10.243	-10.126	1.2%	0.9886	
Q088TC	0.43	15	8.484	8.334	8.261	0.9%	0.9912	
Q098TA	0.43	15	7.393	7.559	7.67	-1.4%	1.0147	
Q100TB	0.748	13.3	-8.831	-9.151	-8.789	4.1%	0.9604	
Q102TC	0.748	13.3	3.93	4.352	4.213	3.3%	0.9681	
						<b>median</b>	<b>3.02%</b>	<b>0.9707</b>



Manual additional quadrupole field factor =  (default 0.97021)

Load A1900 settings

This utility works properly with "e\_A1900\_2018.lpp" file (extended config.)

1. Load A1900 configuration

Default printout directory = C:\buffer\_LAB\A1900\_settings\txt

2. Browse file: Print31Jan18\_16h08.txt

3. Read data

Title: A1900 "Print31Jan18\_16h08.txt" Wednesday 16:08:48 2018-01-31 A1900  
 Moe\_258 \*\*\*\* Se-71 to AC233 (prelim) \*\*\*\*  
 Expt: 00338 "Gas Cell Equipment Test" [Sumithrarachchi] Line: h [10]

4. Load values in the code & Calculate matrices

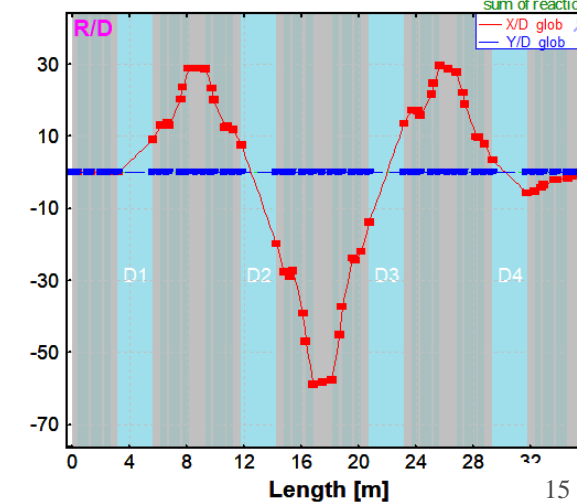
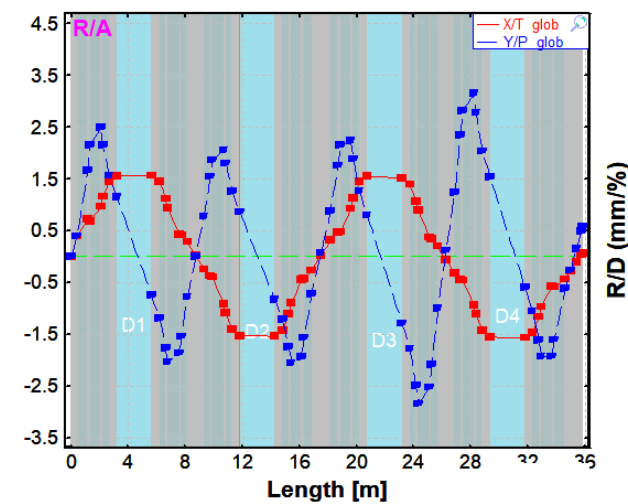
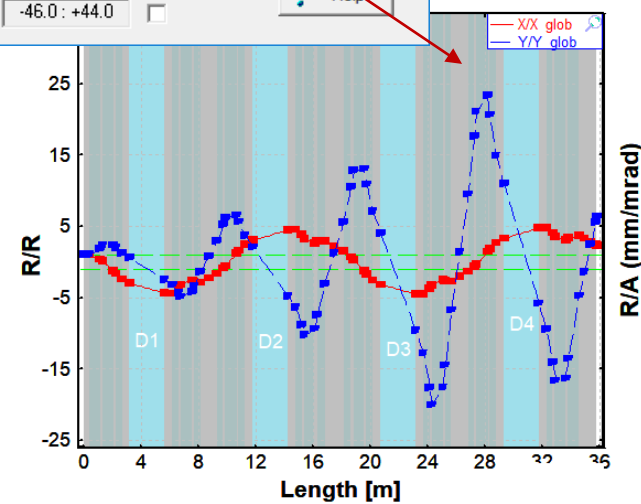
Values	use	Values	use
Projectile = 78Kr34+	<input type="checkbox"/>	Dipole fields = N = 4	<input checked="" type="checkbox"/>
Energy [title] (MeV/u) = 150	<input type="checkbox"/>	Quadrupole fields = N = 24(24)	<input checked="" type="checkbox"/>
Energy [Seg0] (MeV/u) = 150.056	<input type="checkbox"/>	Use A1900 Quadrupole fudging factors	<input checked="" type="checkbox"/>
RF (MHZ) = 23.7972	<input type="checkbox"/>	Manual additional quadrupole field factor = 0.9705 (default 0.9702)	<input checked="" type="checkbox"/>
Target [Z13] = Be 66.0	<input type="checkbox"/>	Sextupole fields = N = 16	<input type="checkbox"/>
Target [Z14] = out	<input type="checkbox"/>	I1-slits [Z37] = -8.0 : +8.0	<input type="checkbox"/>
Target [Z15] = Be 94.0	<input type="checkbox"/>	I2-slits [Z57,Z61] = -14.8 : +14.8	<input type="checkbox"/>
Target [Z16] = out	<input type="checkbox"/>	FP-slits [Z104] = -46.0 : +44.0	<input type="checkbox"/>
wedge [Z59] = Al 300.0	<input type="checkbox"/>		

Buttons: Exit, Quit, Help

A1900 2018-data with A1900 quadrupole fudging factors and the Manual additional LISE factor = 0.9705

### First order matrix elements

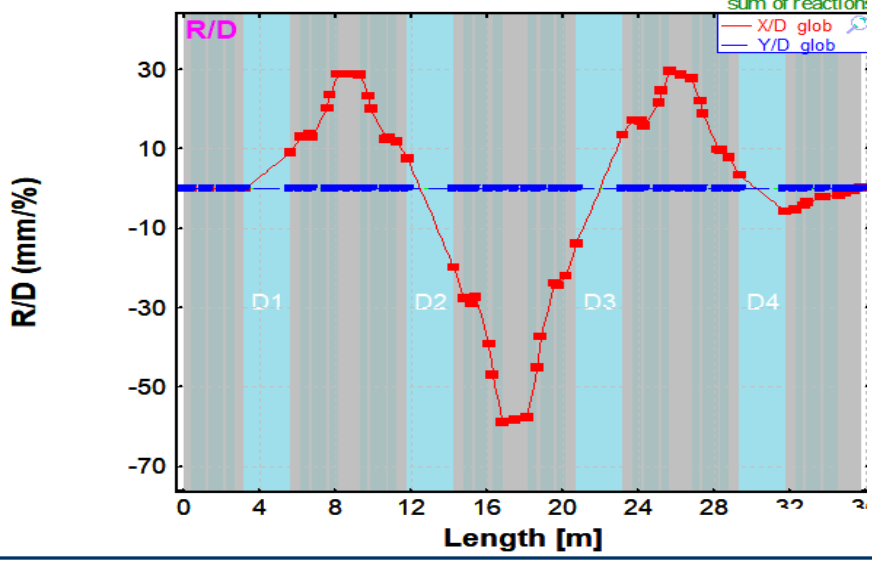
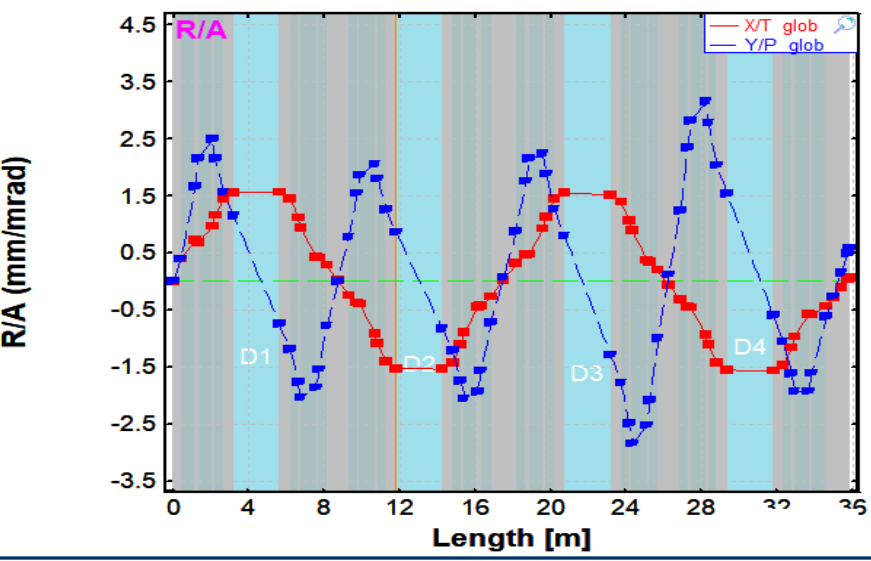
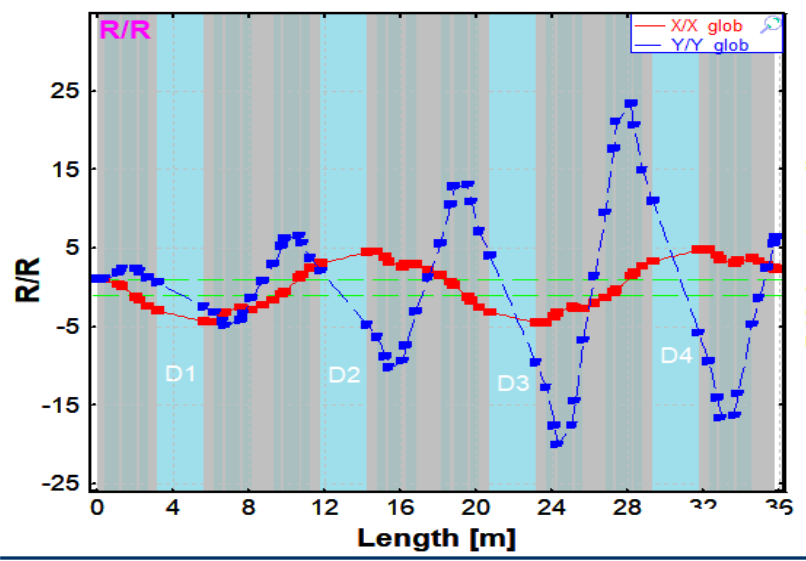
<sup>1</sup>H (358.82 MeV/u); Settings on <sup>1</sup>H; Config: DSSSSFSSSFDFSSSSSSSFFFFSS dp/p=5.15% ; Wedges: 0; Brho(Tm): 3.6255, 3.6255, 3.6255, 3.2829, 3.2829....



A1900 2018-data with A1900 quadrupole fudging factors and the Manual additional LISE factor = 0.9705

## First order matrix elements

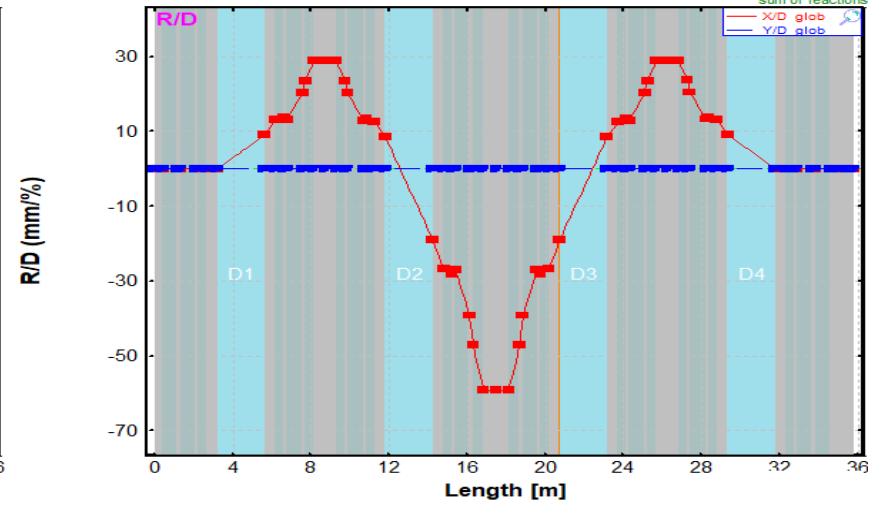
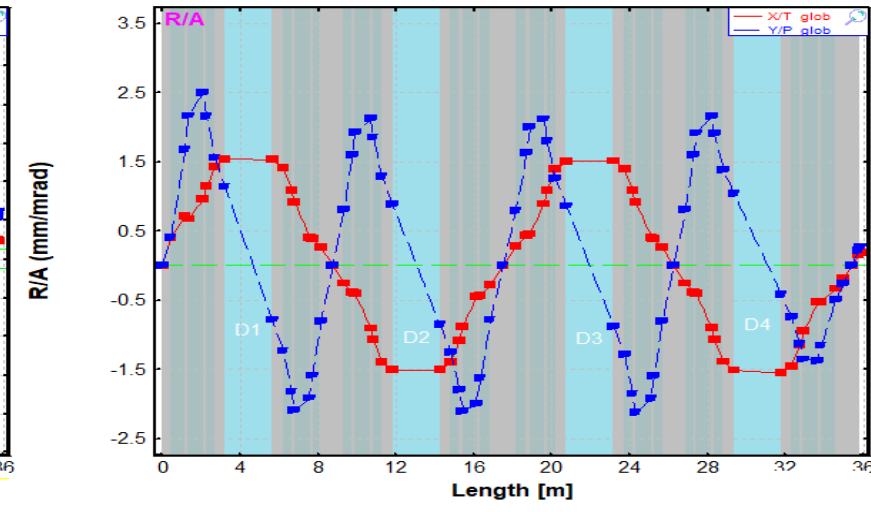
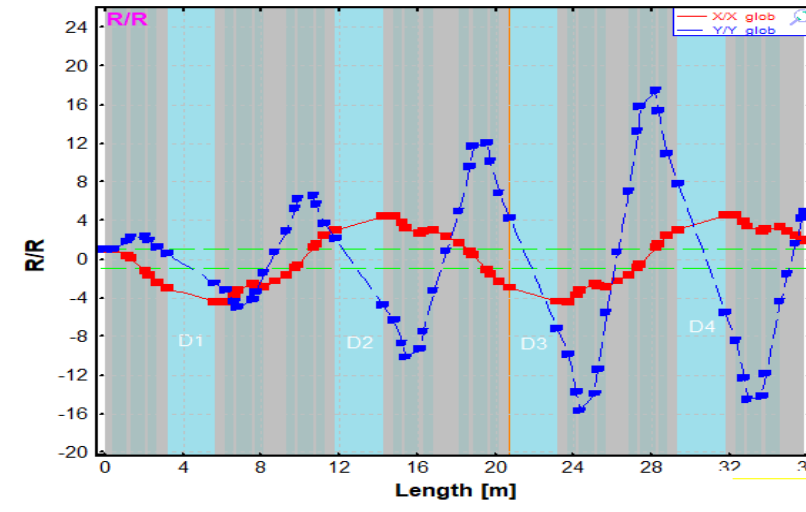
$^1\text{H}$  (358.82 MeV/u); Settings on  $^1\text{H}$ ; Config: DSSSFSSSFDFSSSSSSFFFFFSS  
 $dp/p=5.15\%$  ; Wedges: 0; Brho(Tm): 3.6255, 3.6255, 3.6255, 3.2829, 3.2829....



LISE++ fields optimization (original e\_A1900\_LISE\_2018.lpp file)

## First order matrix elements

$^1\text{H}$  (358.82 MeV/u); Settings on  $^1\text{H}$ ; Config: DSSSFSSSFDFSSSSSSFFFFFSS  
 $dp/p=5.07\%$  ; Wedges: 0; Brho(Tm): 3.0000, 3.0000, 3.0000, 3.0000, 3.0000....

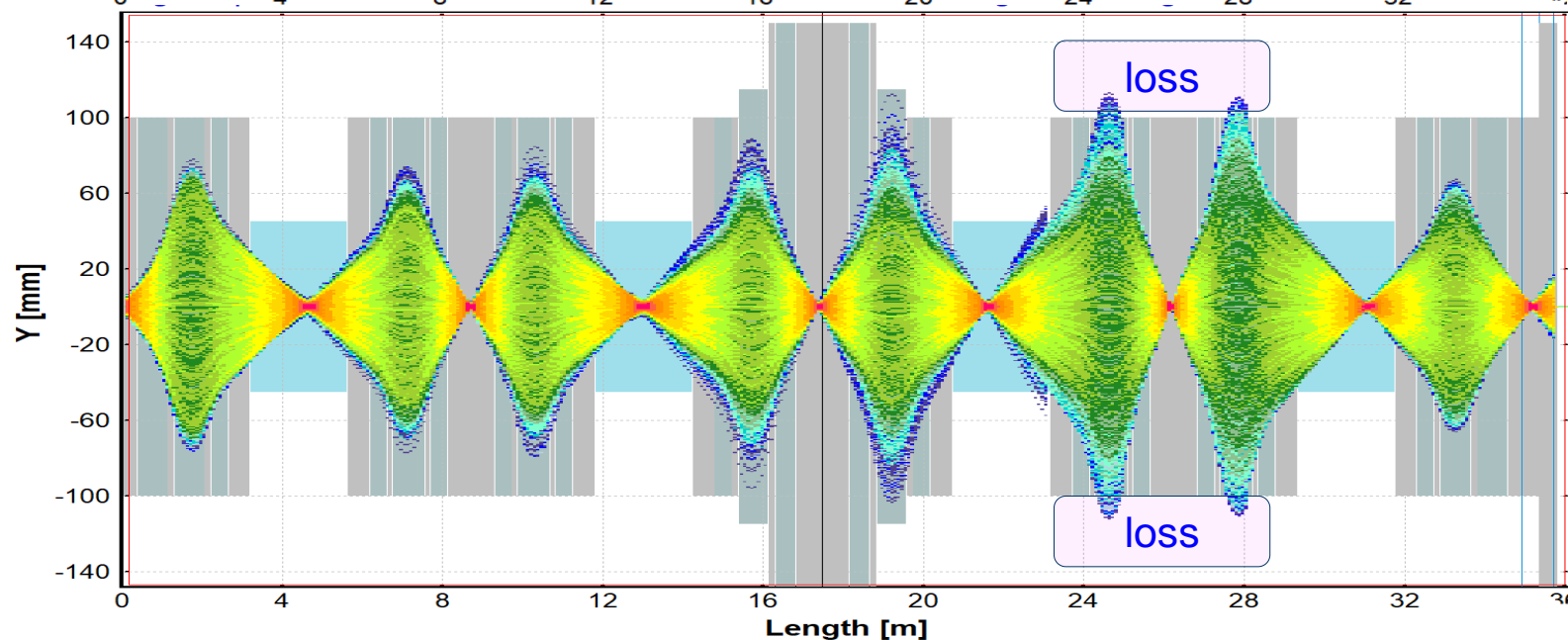
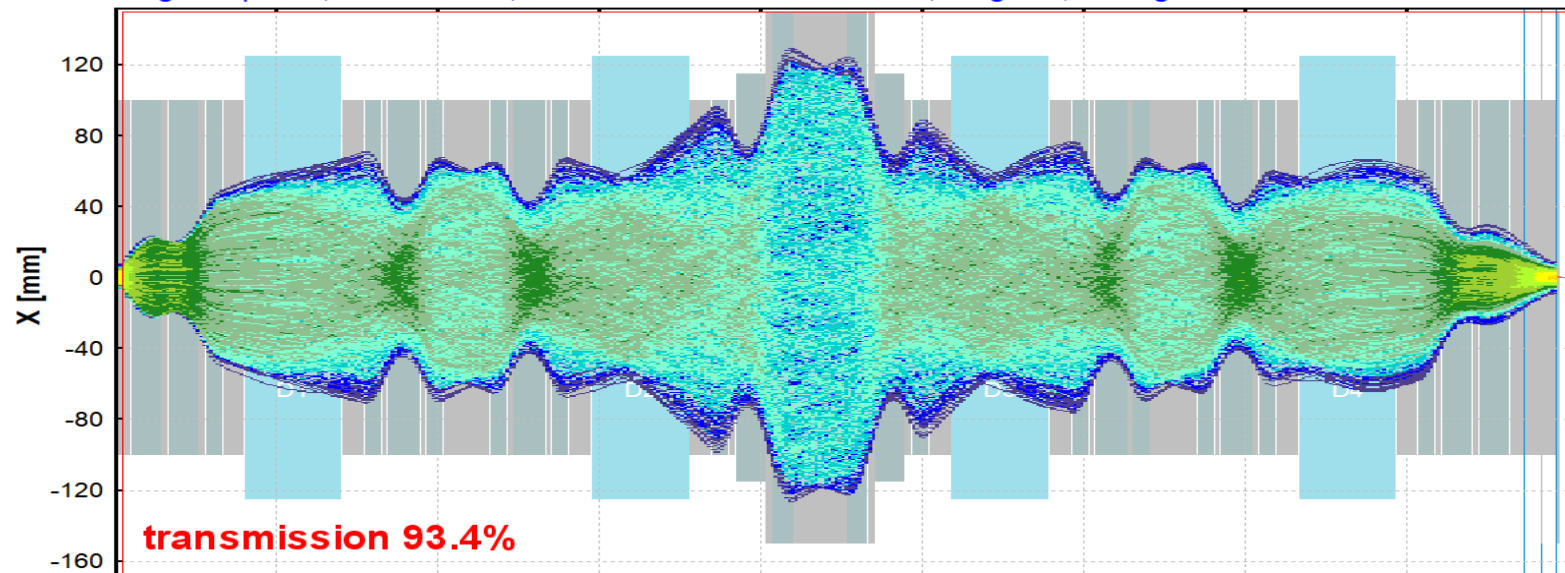




1H (358.82 MeV/u) + ; Transmitted Fragment 1H (beam); Optics Order: 1  
 dp/p=5.15% ; Wedges: 0; Brho(Tm): 3.0000, 3.0000, 3.0000, 3.0000, 3.0000...  
 AngAccept: Off; Bounds: ON; "z106" - last block for MC calc; no gates; Config: DSSSSSSSDSSSSSSSSSS

Emittance [#1]

	Beam CARD (sigma, semi-axis, half-width...)	1D - shape (Distribution method)
1. X	mm 1	Gaussian
2. T	mrad 30	Rectangle uniform
3. Y	mm 1	Gaussian
4. P	mrad 25	Rectangle uniform
5. L	mm 0	Gaussian
6. D	% 2	Rectangle uniform



Default printout directory = C:\buffer\_LAB\A1900\_settings\txt

2. Browse file: Print31Jan18\_16h08.txt

3. Read data

Title: A1900 "Print31Jan18\_16h08.txt" Wednesday 16:08:48 2018-01-31 A1  
 Moe\_258 \*\*\* Se-71 to AC233 (prelim) \*\*\*  
 Expt: 00338 "Gas Cell Equipment Test" [Sumithrarachchi] Line: h [10]

4. Load values in the code & Calculate matrices

Values	use	Values	use
Projectile = 78Kr34+	<input type="checkbox"/>	Dipole fields = N = 4	<input checked="" type="checkbox"/>
Energy [title] (MeV/u) = 150	<input type="checkbox"/>	Quadrupole fields = N = 24(24)	<input checked="" type="checkbox"/>
Energy [Seg0] (MeV/u) = 150.056	<input type="checkbox"/>	Use A1900 Quadrupole fudging factors	<input checked="" type="checkbox"/>
RF (MHZ) = 23.7972	<input type="checkbox"/>	Manual additional quadrupole field factor = (default 0.9702)	<input checked="" type="checkbox"/>
Target (Z13) = Be 66.0	<input type="checkbox"/>	Sextupole fields = N = 16	<input type="checkbox"/>
Target (Z14) = out	<input type="checkbox"/>	11-slits (Z37) = -8.0 : +8.0	<input type="checkbox"/>
Target (Z15) = Be 94.0	<input type="checkbox"/>	12-slits (Z57,Z61) = -14.8 : +14.8	<input type="checkbox"/>
Target (Z16) = out	<input type="checkbox"/>	FP-slits (Z104) = -46.0 : +44.0	<input type="checkbox"/>
wedge (Z59) = Al 300.0	<input type="checkbox"/>		

Version 11.0.8 (update)  
11/13/18

Load A1900 settings

This utility works properly with "e\_A1900\_2018.lpp" file (extended config.)

1. Load A1900 configuration

Default printout directory = I:\departments\operations\beamdata\BeamLines\VAC Line

2. Browse file: 2018\_10\_31\_16h56m43.txt

3. Read data

Title: A1900 to BTS44 2018\_10\_31\_16h56m43.txt -- Wed 31 Oct 2018 16:56:43  
"Se-87 to gas cell"  
Expt: 16033 "Study of Kr isotopes for astr"[Artemis Spyrou]

4. Load values in the code & Calculate matrices

Please check next settings:

- \* Beam energy.
- \* Setting Fragment.
- \* Target thickness.
- \* Wedge thickness.

Parameter	Value	use	Parameter	Value	use
Projectile	96Zr37+	<input type="checkbox"/>	Dipole fields	N = 4	<input checked="" type="checkbox"/>
Energy [title] (MeV/u)	120	<input type="checkbox"/>	Quadrupole fields	N = 24(24)	<input checked="" type="checkbox"/>
Energy [Seg0] (MeV/u)	-1	<input type="checkbox"/>	Use A1900 Quadrupole fudging factors		<input checked="" type="checkbox"/>
RF (MHZ)	21.7819	<input type="checkbox"/>	Manual additional quadrupole field factor (default 0.9702)	0.971	<input checked="" type="checkbox"/>
Target [Z13]	out	<input type="checkbox"/>	Sextupole fields	N = 16	<input checked="" type="checkbox"/>
Target [Z14]	out	<input type="checkbox"/>	11-slits [Z37]	-16.0 : +16.1	<input checked="" type="checkbox"/>
Target [Z15]	Be 282.0	<input type="checkbox"/>	12-slits [Z57,Z61]	-29.6 : +29.6	<input checked="" type="checkbox"/>
Target [Z16]	out	<input type="checkbox"/>	FP-slits [Z104]	-4.9 : +5.2	<input checked="" type="checkbox"/>
wedge [Z59]	Al 150.0	<input type="checkbox"/>			

Buttons: Exit, Quit, Map plot, Help

**Save current quad fields to scratch** (highlighted)

Envelope of First order matrix elements

Components:  X, X'  Y, Y'  X, X' & Y, Y'  Add "L" row

Matrices:  Global  Local  Global & Local

Show:  only Diagonal elements (AA', BB')  only Off-Diagonal elements (AB', BA')  all elements

Dimension:  mm / mrad  cm / mrad

Quad strength plot:  Quadrupole field strengths plot

Copy current quad fields to scratch

Buttons: Plot, Quit

Load A1900 settings

This utility works properly with "e\_A1900\_2018.lpp" file (extended config.)

1. Load A1900 configuration

Default printout directory = I:\departments\operations\beamdata\BeamLines\VAC Line

2. Browse file: 2018\_10\_31\_16h56m43.txt

3. Read data

Title: A1900 to BTS44 2018\_10\_31\_16h56m43.txt -- Wed 31 Oct 2018 16:56:43  
"Se-87 to gas cell"  
Expt: 16033 "Study of Kr isotopes for astr"[Artemis Spyrou]

4. Load values in the code & Calculate matrices

Please check next settings:

- \* Beam energy.
- \* Setting Fragment.
- \* Target thickness.
- \* Wedge thickness.

Parameter	Value	use	Parameter	Value	use
Projectile	96Zr37+	<input type="checkbox"/>	Dipole fields	N = 4	<input checked="" type="checkbox"/>
Energy [title] (MeV/u)	120	<input type="checkbox"/>	Quadrupole fields	N = 24(24)	<input checked="" type="checkbox"/>
Energy [Seg0] (MeV/u)	-1	<input type="checkbox"/>	Use A1900 Quadrupole fudging factors		<input checked="" type="checkbox"/>
RF (MHZ)	21.7819	<input type="checkbox"/>	Manual additional quadrupole field factor (default 0.9702)	0.971	<input checked="" type="checkbox"/>
Target [Z13]	out	<input type="checkbox"/>	Sextupole fields	N = 16	<input checked="" type="checkbox"/>
Target [Z14]	out	<input type="checkbox"/>	11-slits [Z37]	-16.0 : +16.1	<input checked="" type="checkbox"/>
Target [Z15]	Be 282.0	<input type="checkbox"/>	12-slits [Z57,Z61]	-29.6 : +29.6	<input checked="" type="checkbox"/>
Target [Z16]	out	<input type="checkbox"/>	FP-slits [Z104]	-4.9 : +5.2	<input checked="" type="checkbox"/>
wedge [Z59]	Al 150.0	<input type="checkbox"/>			

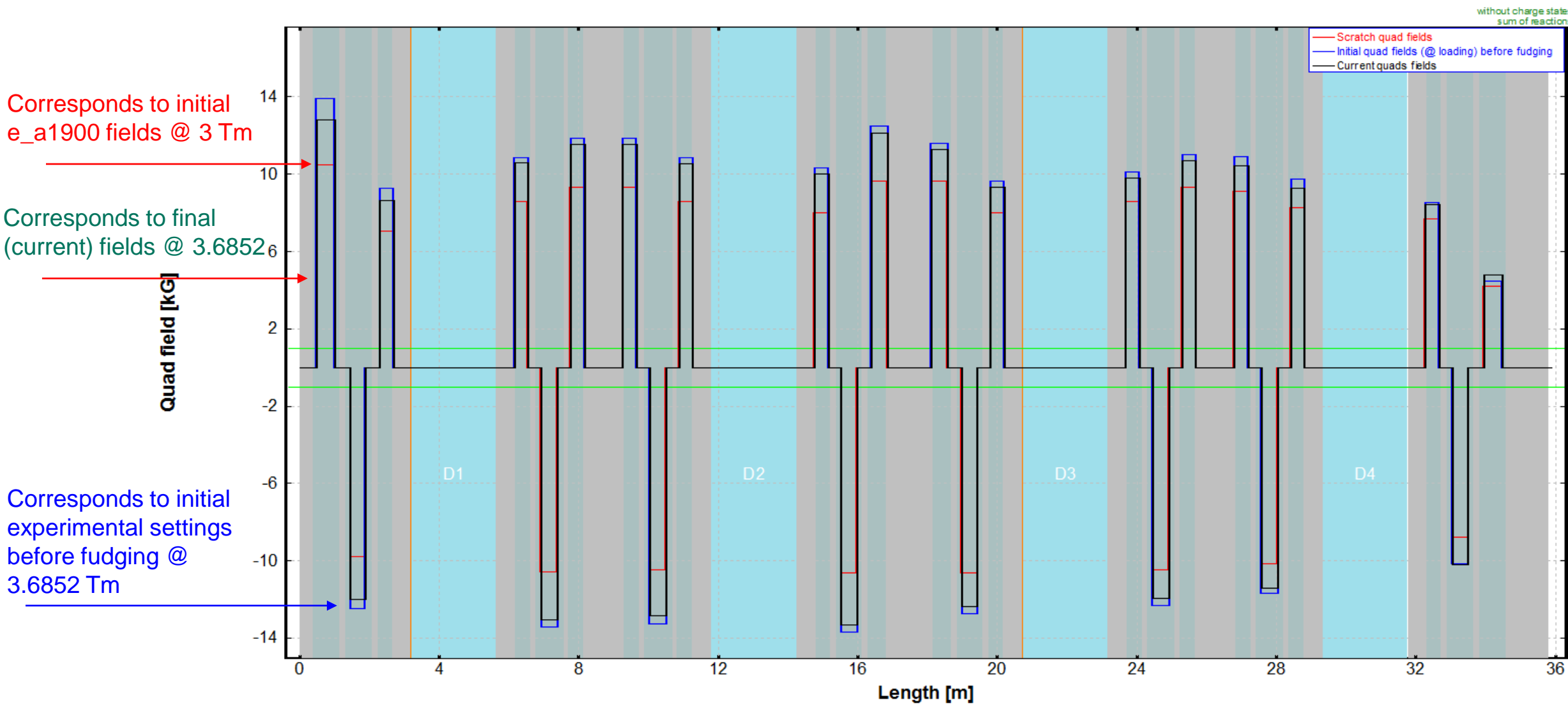
Buttons: Exit, Quit, Map plot, Help

**Only fields** (highlighted)

Version 11.0.8 (update)  
11/13/18

## Quadrupole field strengths

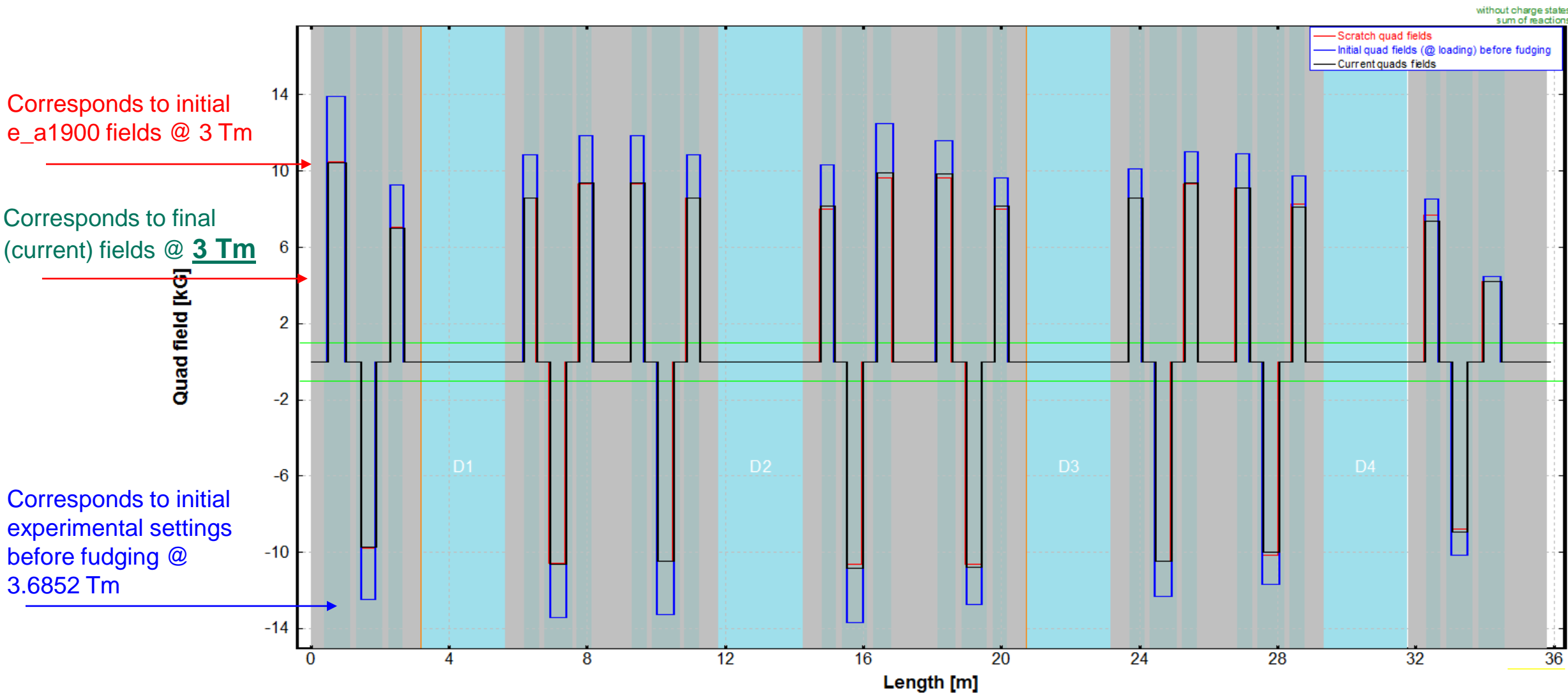
$^1\text{H}$  (358.82 MeV/u); Settings on  $^1\text{H}$ ; Config: DSSSFSSSFDFSSSSSSFFFFSS...  
dp/p=1.01% ; Wedges: 0; Brho(Tm): 3.6852, 3.6852, 3.6852, 3.4331, 3.4331....



Version 11.0.8 (update)  
11/13/18

## Quadrupole field strengths

$^1\text{H}$  (358.82 MeV/u); Settings on  $^1\text{H}$ ; Config: DSSSFSSSFDFSSSSSSFFSS...  
dp/p=1.01% ; Wedges: 0; Brho(Tm): 3.0000, 3.0000, 3.0000, 3.0000, 3.0000....



1. New utility allows to download experimental settings (targets, wedge, slits, and multipoles<sub>2,4,6</sub> settings) and plot envelopes and spatial distributions.
2. The manual field factor allows reproduce a1900 COSY-based settings with LISE<sup>++</sup> Transport-based calculations.
3. Tweaking magnetic A1900 fields immediately can be visualized @ LISE<sup>++</sup> with the new utility in order to understand A1900 optics , and in particular A1900 fudging factors.
4. Probably for separator rigidity settings far from 3 Tm the manual field factor should be adjusted.
5. Possible adaptation of the utility to other NSCL lines.
6. Puzzle with A1900 transmission values (page 11). Focal and dispersive properties are the same for both COSY and LISE<sup>++</sup> optics calculation. Difference should be observed in transmission.