

version 2.1.8

1st part “Development“ by OT
2nd part “Application” by MH

“Development“

1. Shell (version 2.1)
2. Output Result files (intersection, tracing)
3. Output Result file plotting
4. New I/O MOTER file format (version 2.1)
5. MOTER initialization file
6. Source optimization, debugging (DipoleBlockModule)
7. MOTER help file
8. MOTER web-page

The code operates under MS Windows environment and provides a highly user-friendly interface.
This program is part of the LISE++ package which can be freely downloaded from the following internet addresses:

<http://www.nsci.msu.edu/lise>

Status of LISE++ and MOTER codes

http://groups.nsci.msu.edu/lise/paper/2008/LISE_2008.pdf

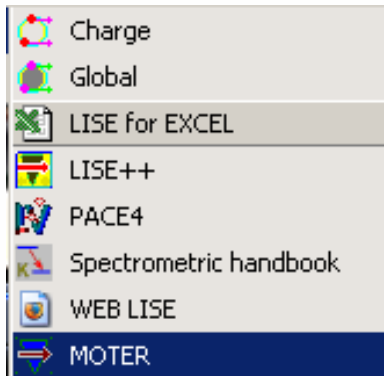
Page 36

Fragment Separator Experts Meeting
East Lansing, USA, 03/31-04/02/08

MOTER: beta-version (v.2.0)

http://groups.nsci.msu.edu/lise/paper/2008/2008_02_29_MOTER.pdf

LISE folder



MOTER documentation through ftp-server

Index of <ftp://ftp.nsci.msu.edu/pub/lise/LISE++/moter/>

Up to higher level directory

Name	Size
Bertz_PRC93.pdf	172 KB
PAC1991_0281.PDF	352 KB
how to use Moter (1987).pdf	169 KB

File association

Name	↑Ext	Size	Date	Attr
[..]		<DIR>	07/17/2008 00:15---	
A1900_2007	lcn	57,752	12/05/2007 18:30-a--	
a1900_08	moter	11,997	07/16/2008 23:19-a--	
a1900_08	motrace	2,524,498	07/16/2008 23:36-a--	
a1900_08	motsec	7,982	07/16/2008 23:36-a--	

*.motsec

It is necessary to set positions to print ray data

10 LPRIMP(L)
L=1,10

Positions to print ray data. Use -1 to signal no more positions wanted, but all 10 spaces must have values; e.g. 0,5,10,-1,0,0,0,0,0 would be used to see the ray data at locations 0,5 and 10.

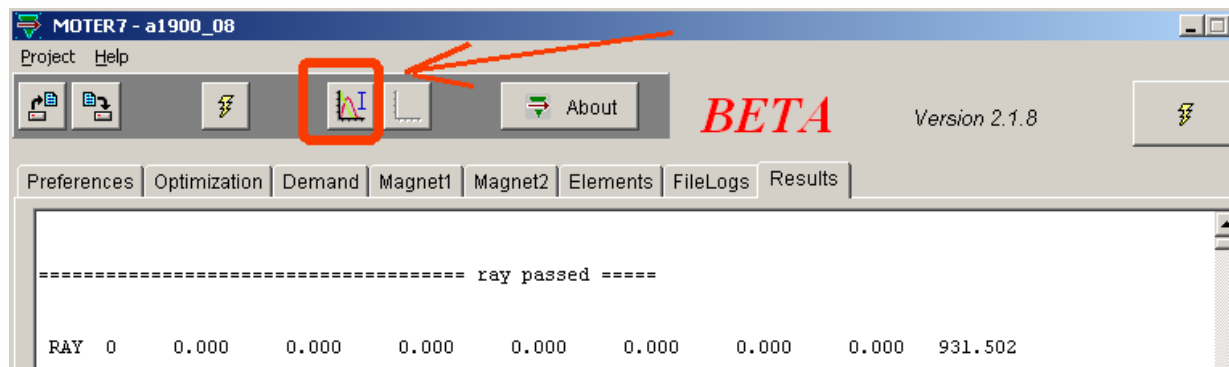
0	18	36	-1	0	0	0	0	0	0
---	----	----	----	---	---	---	---	---	---

```

Lister - [c:\user\c\Moter_builder_2007\files\moter\a1900\a1900_08.motsec]
File Edit Options Help 21 %
1 0 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
1 18 -3.4657e-01 1.5355e-02 -3.7534e-09 3.7018e-08 1.73311e+03 0.0000e+00
1 36 -5.9931e-04 -1.3387e-02 5.9324e-09 -9.7205e-08 3.46621e+03 0.0000e+00
2 0 1.1020e-01 -6.4090e+00 -2.5291e-01 -7.6878e+00 0.00000e+00 -2.3713e-03
2 18 -1.9407e-01 -4.2317e+00 2.6601e-01 3.3483e+00 1.73092e+03 -2.3713e-03
2 36 1.5753e-02 -8.8330e+00 -1.5359e-01 -2.1139e+00 3.46625e+03 -2.3713e-03
3 0 -2.7067e-01 2.3997e+00 -6.6500e-02 -6.8381e+00 0.00000e+00 -2.3521e-02
3 18 -6.3368e-01 4.5778e+00 7.2431e-02 3.5511e+00 1.73550e+03 -2.3521e-02
3 36 -1.4818e-01 1.2764e+01 -5.7830e-03 -4.5145e+00 3.46624e+03 -2.3521e-02
4 0 1.3346e-01 -5.1026e+00 7.3772e-01 8.2018e+00 0.00000e+00 2.3759e-02
4 18 -2.4144e-01 -2.8155e+00 -9.9986e-01 2.6479e+00 1.73163e+03 2.3759e-02
4 36 3.4986e-03 -4.8396e-01 6.1994e-01 -1.8337e+01 3.46611e+03 2.3759e-02
5 0 -5.1353e-01 8.4748e+00 2.3704e-01 6.9347e+00 0.00000e+00 -3.2157e-02
5 18 -6.2374e-01 1.0937e+01 -4.2338e-01 4.3739e-01 1.73882e+03 -3.2157e-02
5 36 3.5977e-02 2.1910e+01 3.4056e-01 -5.6786e+00 3.46634e+03 -3.2157e-02
6 0 6.6622e-02 -4.6629e+00 -3.8670e-01 5.7048e+00 0.00000e+00 5.2812e-02
6 18 -5.3519e-01 -2.7928e+00 6.1833e-01 -8.9769e+00 1.73164e+03 5.2812e-02
6 36 -5.2558e-02 6.2934e-01 -3.5416e-01 2.4470e+01 3.46619e+03 5.2812e-02
7 0 1.5897e-01 -7.0016e+00 -2.6273e-01 -3.5180e+00 0.00000e+00 -6.6704e-02
7 18 1.8944e-01 -5.1323e+00 3.2595e-01 6.7068e-02 1.73040e+03 -6.6704e-02
    
```

*.motsec

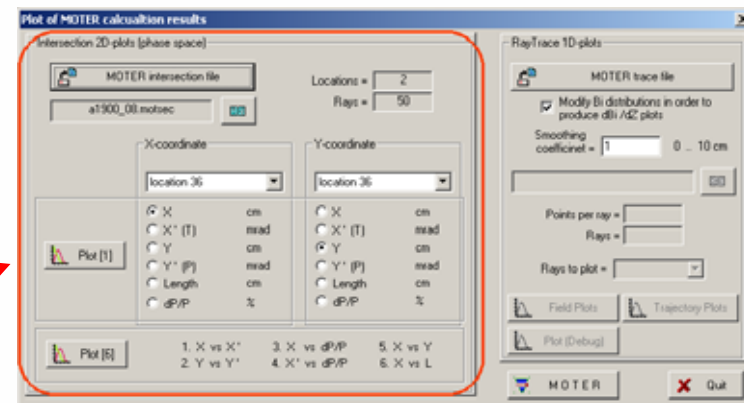
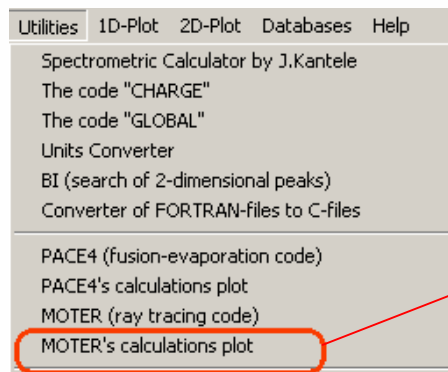
1.
From MOTER



2.
From folder



3.
From LISE++



*.motsec

Plot of MOTER calculation results

Intersection 2D-plots (phase space)

MOTER intersection file: a1900_08.motsec

Locations = 2
Rays = 50

X-coordinate: location 36
Y-coordinate: location 36

Plot [1] options:

<input checked="" type="radio"/> X	cm
<input type="radio"/> X' (T)	mrاد
<input type="radio"/> Y	cm
<input type="radio"/> Y' (P)	mrاد
<input type="radio"/> Length	cm
<input type="radio"/> dP/P	%

Plot [6] options:

<input type="radio"/> X	cm
<input type="radio"/> X' (T)	mrاد
<input checked="" type="radio"/> Y	cm
<input type="radio"/> Y' (P)	mrاد
<input type="radio"/> Length	cm
<input type="radio"/> dP/P	%

Plot [6] legend:

1. X vs X'	3. X vs dP/P	5. X vs Y
2. Y vs Y'	4. X' vs dP/P	6. X vs L

RayTrace 1D-plots

MOTER trace file

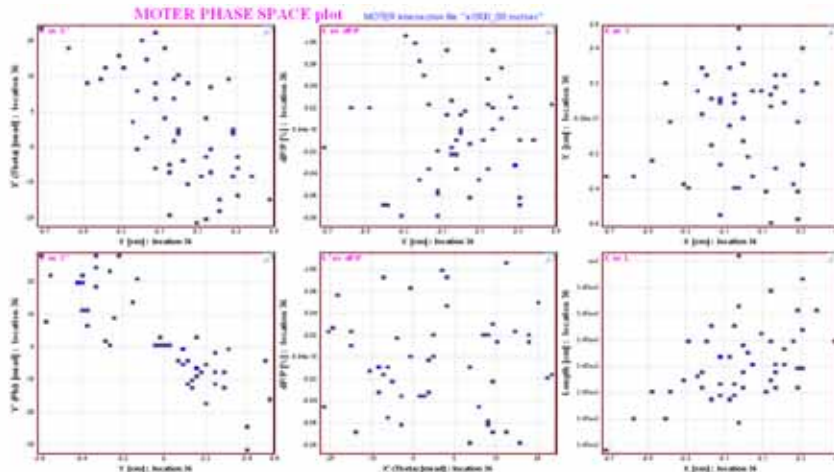
Modify Bi distributions in order to produce dBi /dZ plots

Smoothing coefficient = 1 (0 .. 10 cm)

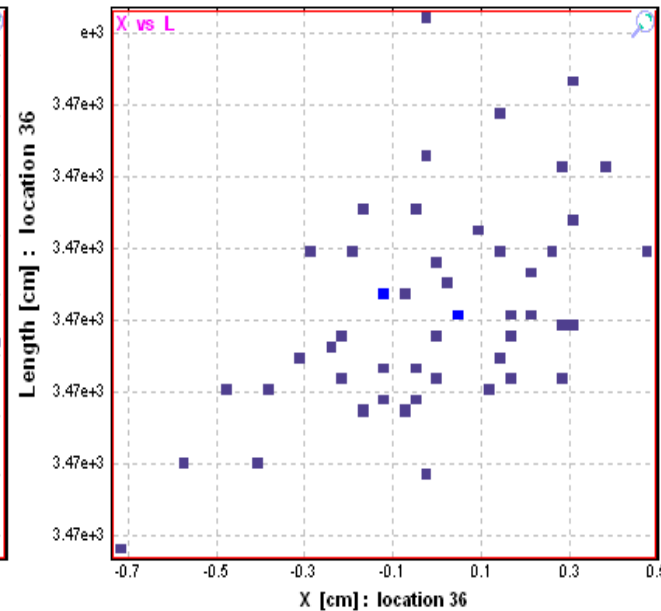
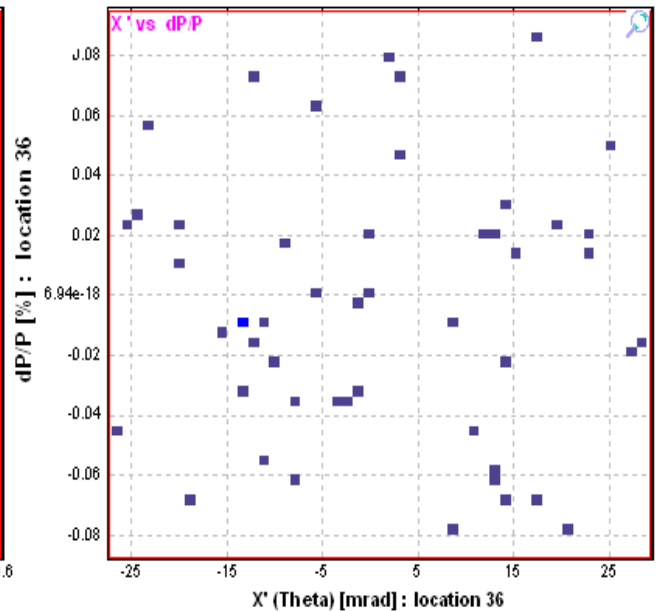
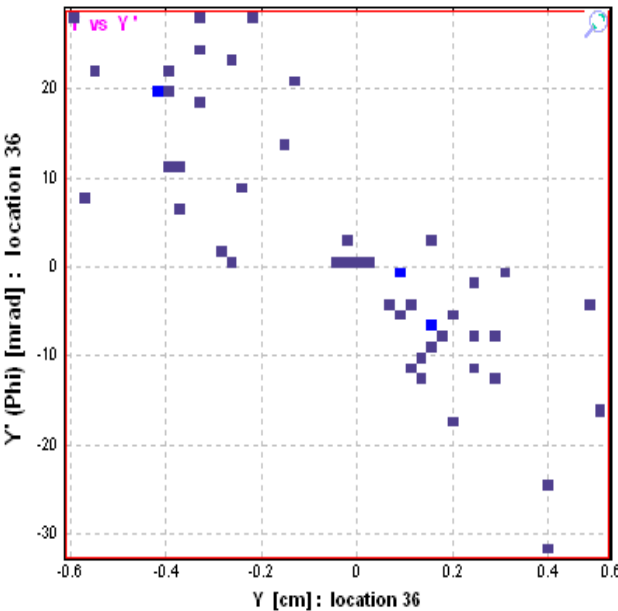
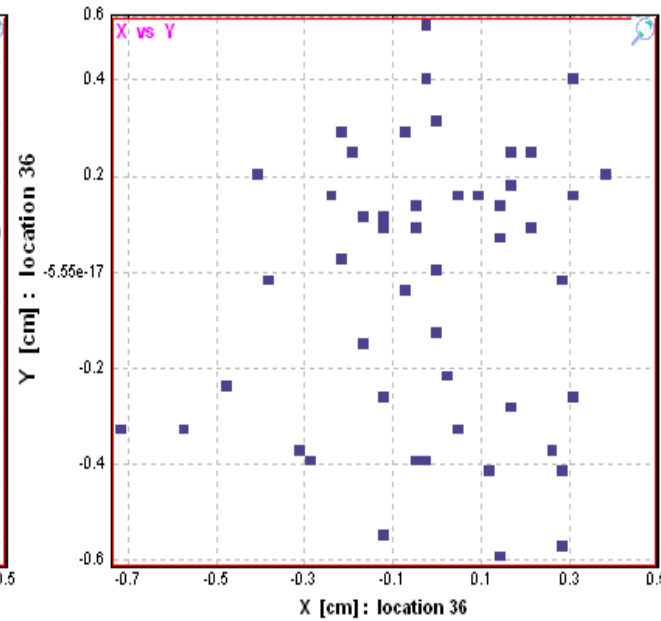
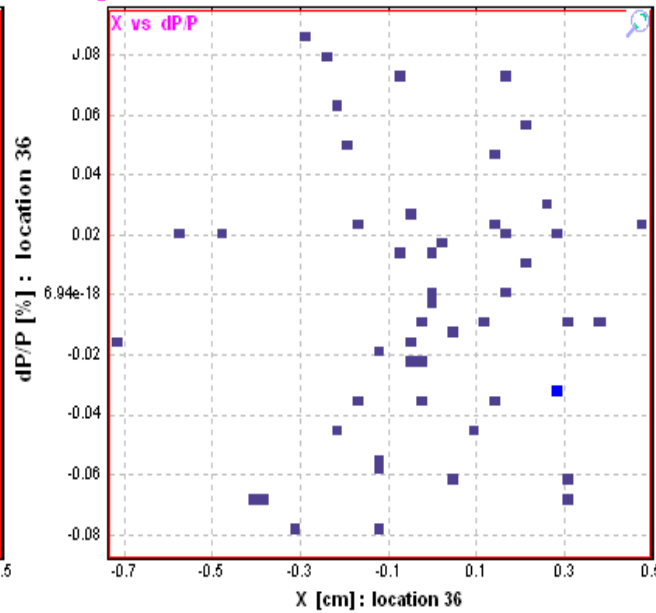
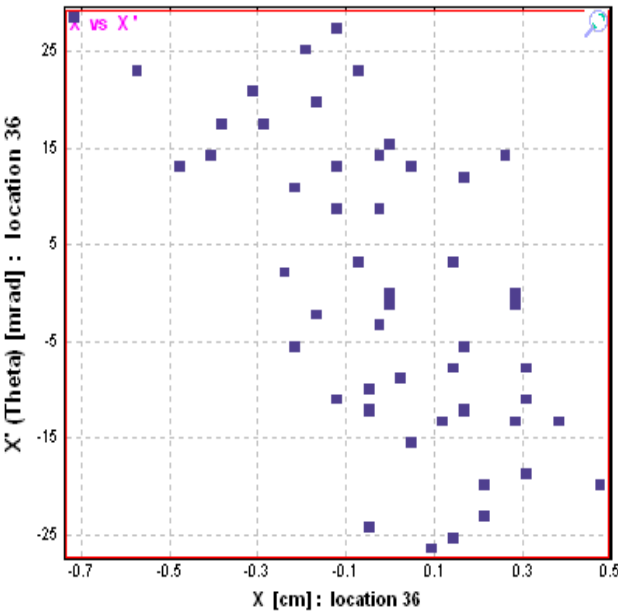
Points per ray =
Rays =
Rays to plot =

Field Plots, Trajectory Plots, Plot (Debug)

MOTER, Quit



MOTER PHASE SPACE plot MOTER intersection file: "a1900_08.motsec"



*. motrace

It is necessary to set positions to print ray data

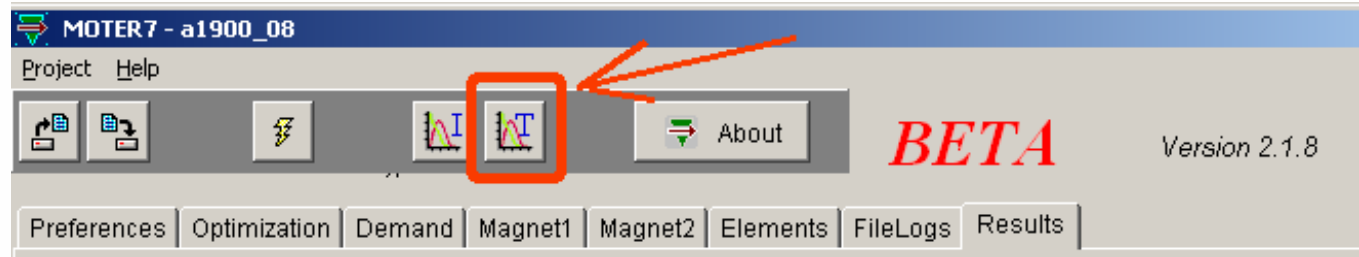
2	NR	<input type="text" value="50"/>		100	Number of rays; 400 MAXIMUM	<i>should be < 200</i>
	NP	<input type="text" value="5"/>	←	1	Print option as in RAYTRACE	<i>for example : each 5 step will be plotted</i>

Listner - [c:\user\c\Moter_builder_2007\files\moter\1900\1900_08.motrace]

Block	Order	X	Y	Z	U	V	W	Q	R	Label		
1	9	2	986.773	996.683	1062.683	1072.593	10.160	10.160	"QUAD"			
1	10	2	1072.593	1082.503	1082.503	1127.103	1154.043	10.160	10.160	"QUAD"		
1	11	7	1154.043	1154.043	1154.043	1154.043	0.000	0.000	"SHRT"			
1	12	1	1154.043	1180.983	1424.385	1449.455	15.000	4.500	"DIPO"			
1	13	7	1449.455	1449.455	1449.455	1449.455	0.000	0.000	"SHRT"			
1	14	2	1449.455	1474.525	1519.125	1529.035	10.000	10.000	"QUAD"			
1	15	2	1529.035	1538.945	1604.945	1613.855	10.000	10.000	"QUAD"			
1	16	2	1613.855	1622.765	1671.365	1733.835	17.000	17.000	"QUAD"			
1	17	10	1733.835	1733.835	1733.835	1733.835	17.000	17.000	"FOCL"			
1	18	2	1733.835	1796.305	1844.905	1853.815	17.000	17.000	"QUAD"			
1	19	2	1853.815	1862.725	1928.725	1938.635	10.000	10.000	"QUAD"			
1	20	7	1938.635	1948.545	1993.145	2018.215	10.000	10.000	"QUAD"			
1	21	2	2018.215	2018.215	2018.215	2018.215	0.000	0.000	"SHRT"			
1	22	1	2018.215	2043.285	2286.688	2313.628	15.000	4.500	"DIPO"			
1	23	7	2313.628	2313.628	2313.628	2313.628	0.000	0.000	"SHRT"			
1	24	2	2313.628	2340.568	2385.168	2395.078	10.160	10.160	"QUAD"			
1	25	2	2395.078	2404.988	2470.988	2480.898	10.160	10.160	"QUAD"			
1	26	2	2480.898	2490.808	2535.408	2600.438	10.160	10.160	"QUAD"			
1	27	10	2600.438	2600.438	2600.438	2600.438	10.160	10.160	"FOCL"			
1	28	2	2600.438	2665.468	2710.068	2719.978	10.160	10.160	"QUAD"			
1	29	2	2719.978	2729.888	2795.888	2805.798	10.160	10.160	"QUAD"			
1	30	2	2805.798	2815.708	2860.308	2887.248	10.160	10.160	"QUAD"			
1	31	1	2887.248	2914.188	3157.591	3184.531	15.000	4.500	"DIPO"			
1	32	2	3184.531	3211.471	3256.071	3265.971	10.160	10.160	"QUAD"			
1	33	2	3265.971	3275.871	3341.871	3351.771	10.160	10.160	"QUAD"			
1	34	2	3351.771	3361.671	3427.671	3467.671	10.160	10.160	"QUAD"			
1	35	10	3467.671	3467.671	3467.671	3467.671	10.160	10.160	"FOCL"			
1	1	0.000E+00	0.000	0.000	0.0000	0.000000	0.0000	0.000000	0.0000	0.000000	1.0000	0.0000
1	1	0.000E+00	0.000	0.000	-0.0000	0.000000	0.0000	0.000000	40.0000	0.000000	-1.0000	-0.0000
1	1	2.400E+01	0.000	0.000	-0.0000	0.000000	0.0000	0.000000	16.0000	0.000000	-1.0000	-0.0000
1	1	4.400E+01	0.000	-0.200	0.0000	0.000000	0.0000	0.000000	-4.0000	0.000000	-1.0000	0.0000
1	1	5.600E+01	0.000	-0.800	0.0000	0.000000	0.0000	0.000000	-16.0000	0.000000	-1.0000	0.0000
1	1	5.600E+01	0.000	-0.800	-0.0000	0.000000	0.0000	0.000000	-50.0000	0.000000	1.0000	-0.0000
1	1	7.600E+01	0.000	-0.800	0.0000	0.000000	0.0000	0.000000	-30.0000	0.000000	1.0000	0.0000
1	1	9.000E+01	0.000	-0.800	0.0000	0.000000	0.0000	0.000000	-16.0000	0.000000	1.0000	0.0000
1	1	9.000E+01	0.000	-0.800	0.0000	0.000000	0.0000	0.000000	-16.0000	0.000000	1.0000	0.0000
1	1	1.100E+02	0.000	0.200	0.0000	0.000000	0.0000	0.000000	4.0000	0.000000	1.0000	0.0000
1	1	1.220E+02	0.000	0.800	0.0000	0.000000	0.0000	0.000000	16.0000	0.000000	1.0000	0.0000
1	1	1.220E+02	0.000	0.800	0.0000	0.000000	0.0000	0.000000	6.1000	0.000000	1.0000	0.0000
1	1	1.159E+02	0.000	0.000	0.0000	0.000000	0.0000	0.000000	0.0000	0.000000	1.0000	0.0000
1	1	1.159E+02	0.000	0.000	-0.0000	0.000000	0.0000	0.000000	9.9000	0.000000	-1.0000	-0.0000
1	1	1.098E+02	0.000	0.000	0.0000	0.000000	0.0000	0.000000	16.0000	0.000000	-1.0000	-0.0000

*.motrace

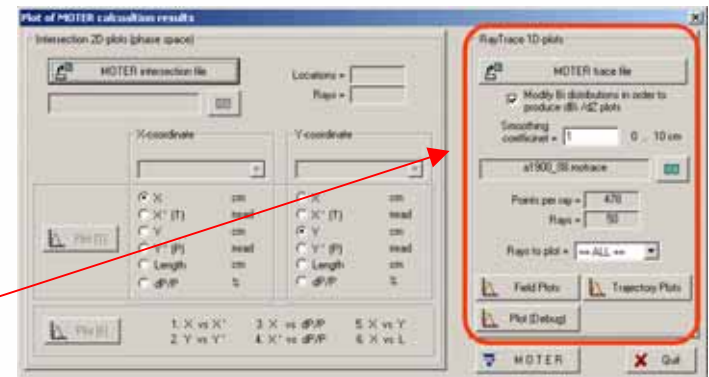
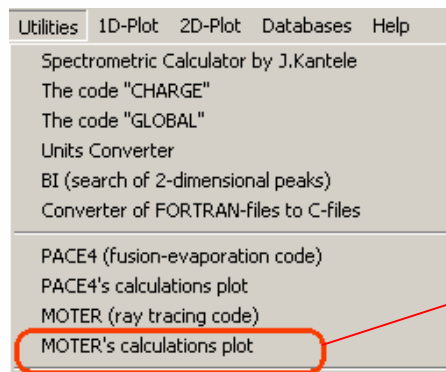
1.
From MOTER



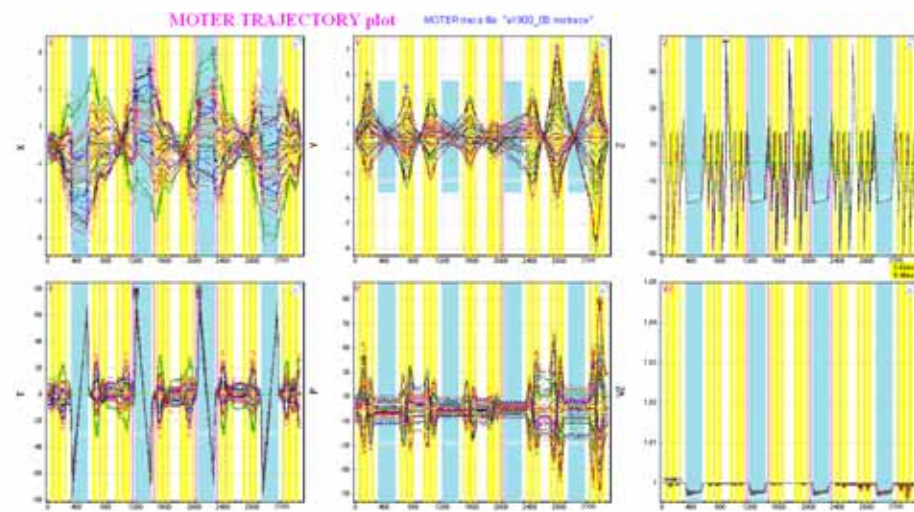
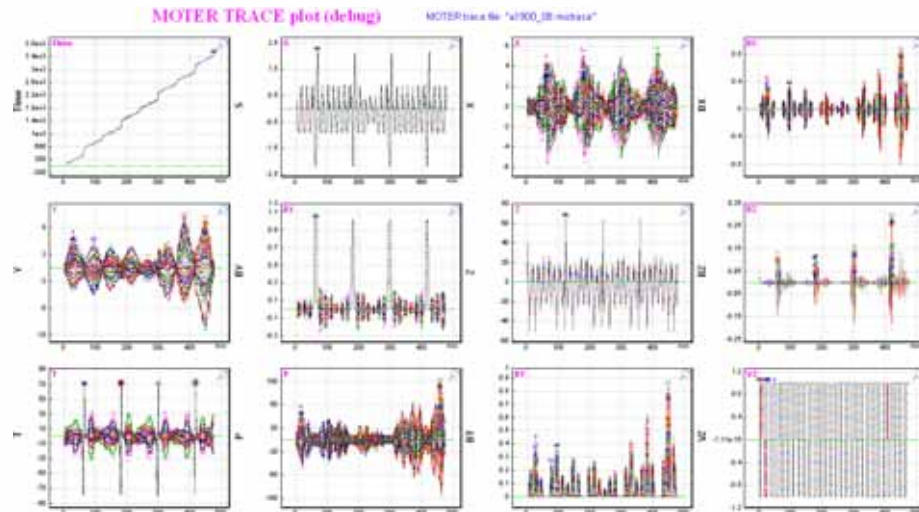
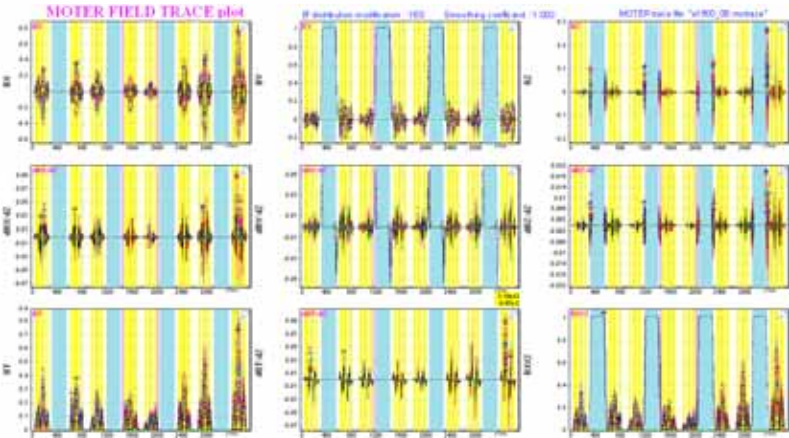
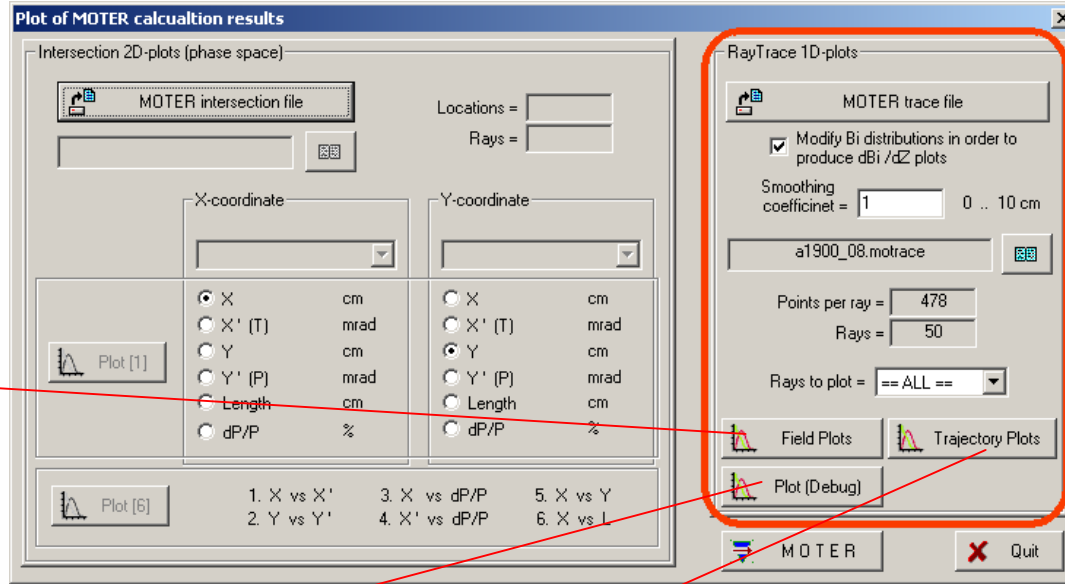
2.
From folder



3.
From LISE++

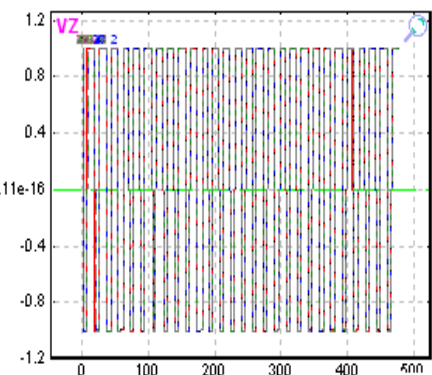
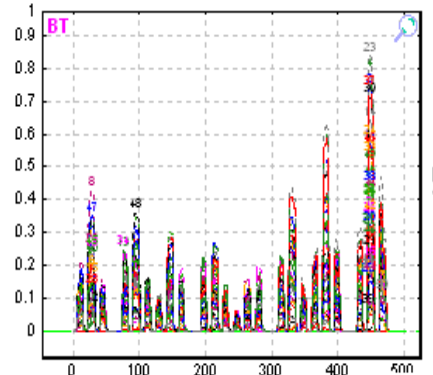
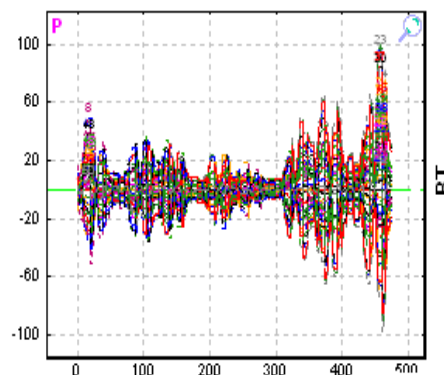
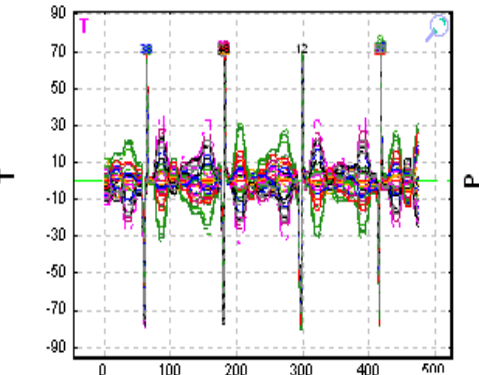
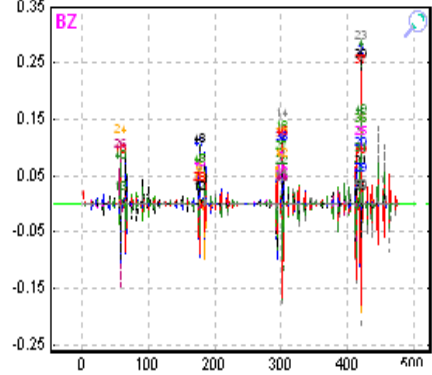
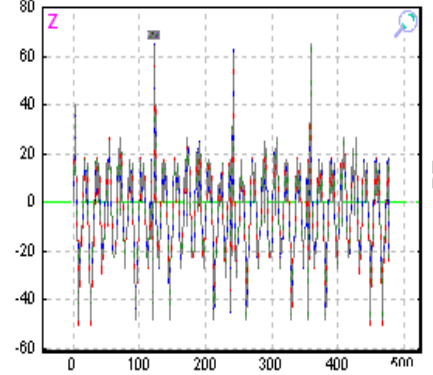
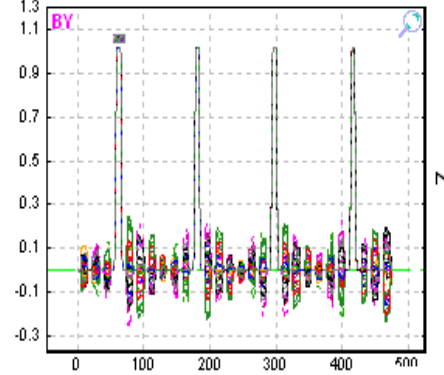
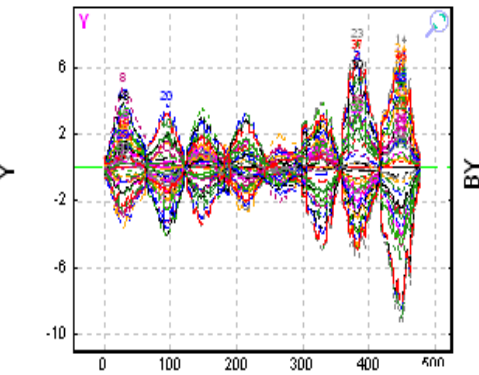
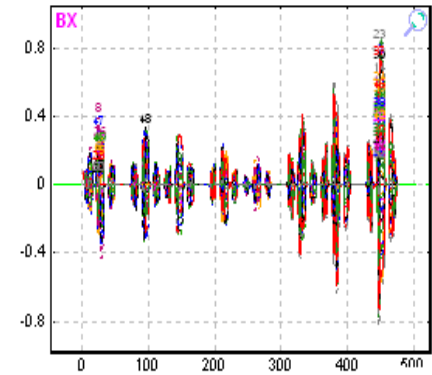
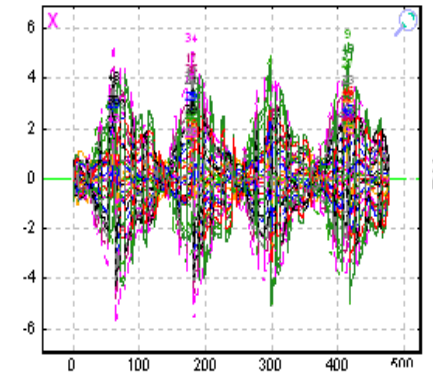
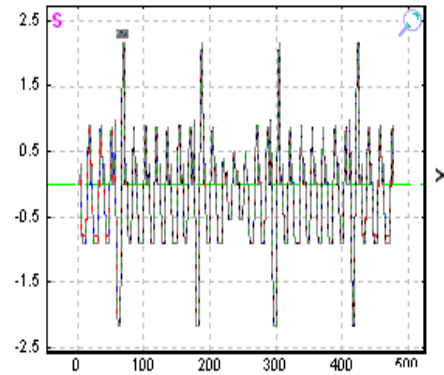
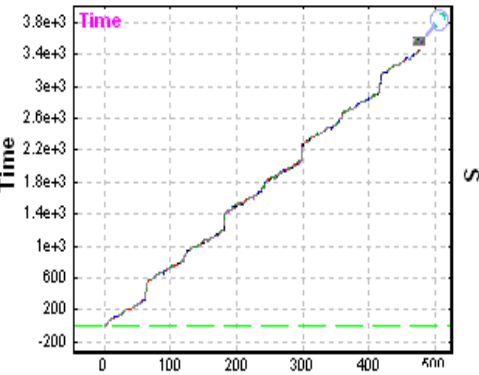


*.motrace



MOTER TRACE plot (debug)

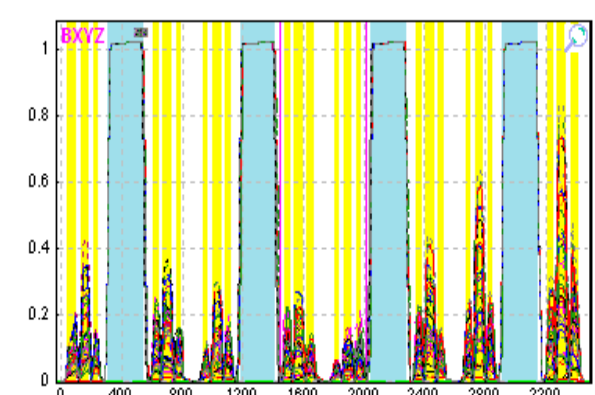
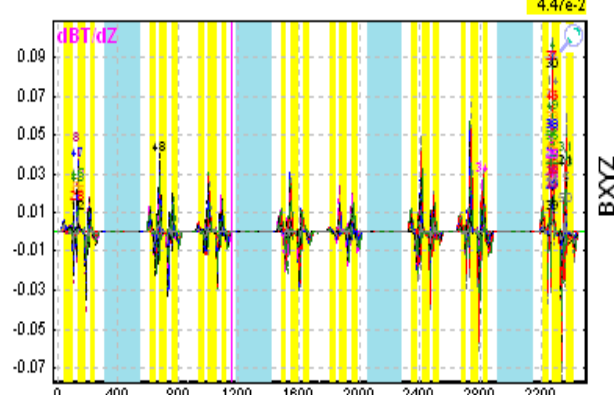
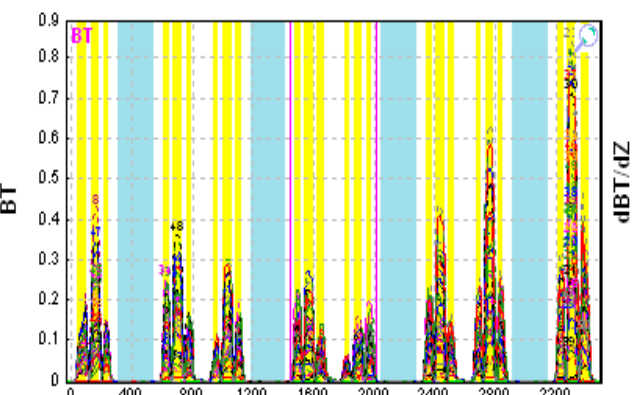
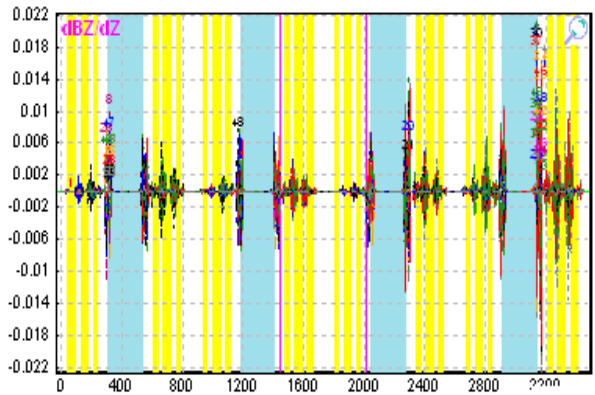
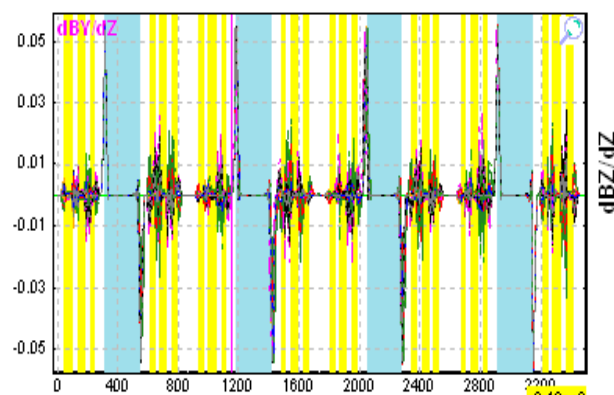
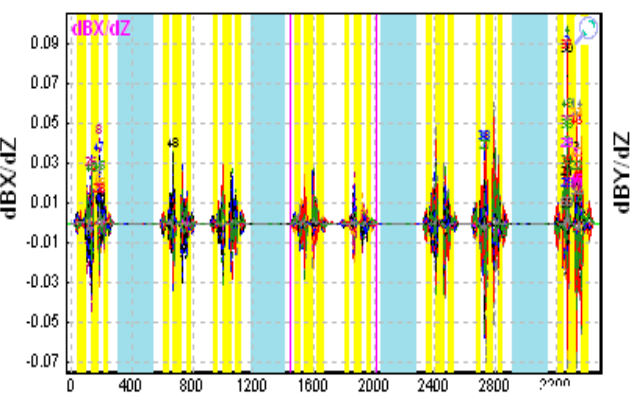
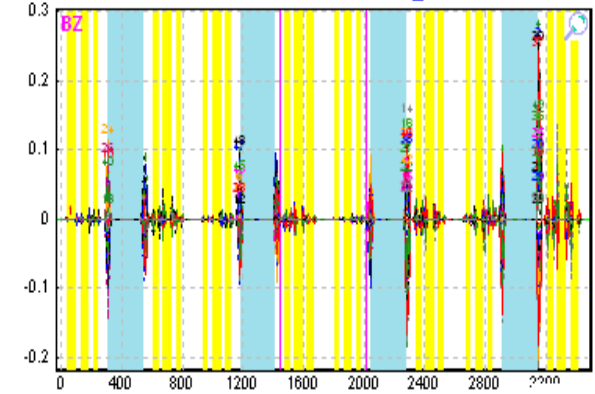
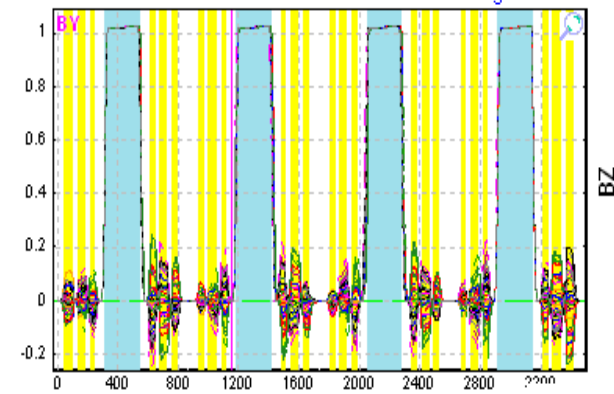
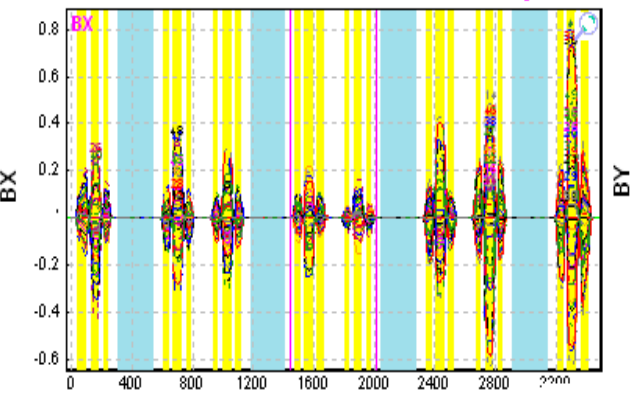
MOTER trace file: "a1900_08.motrace"



MOTER FIELD TRACE plot

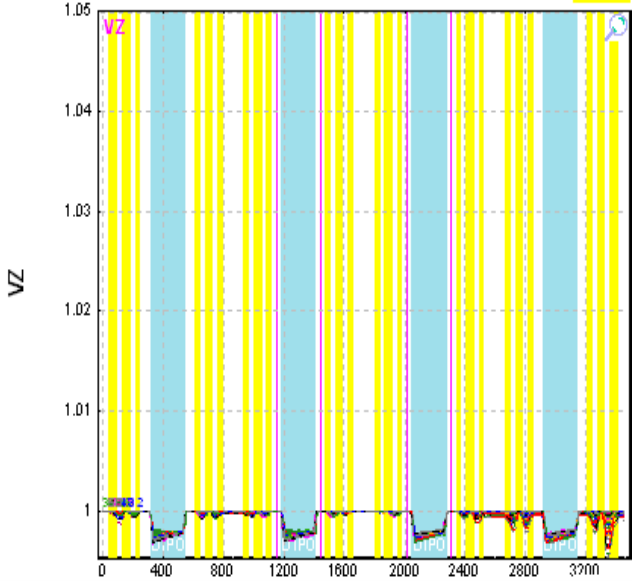
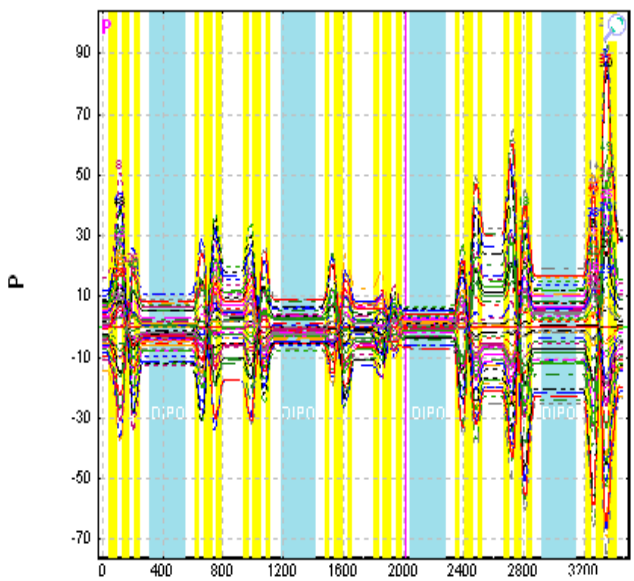
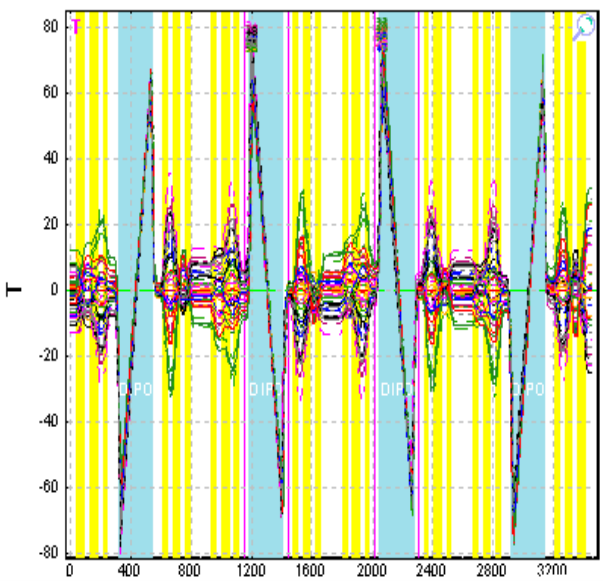
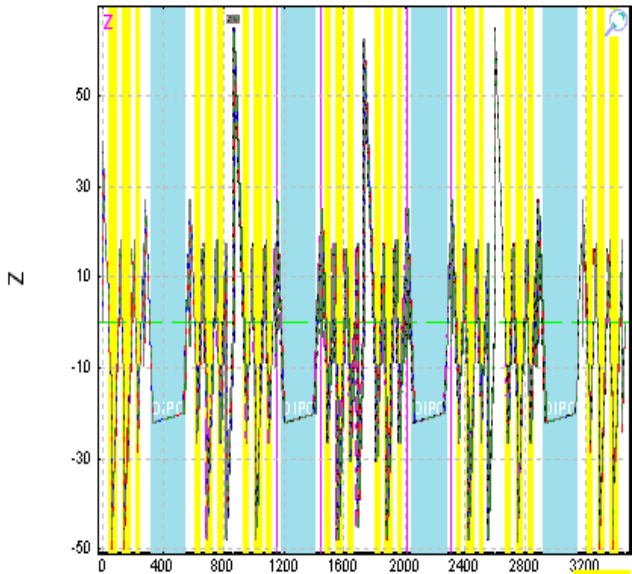
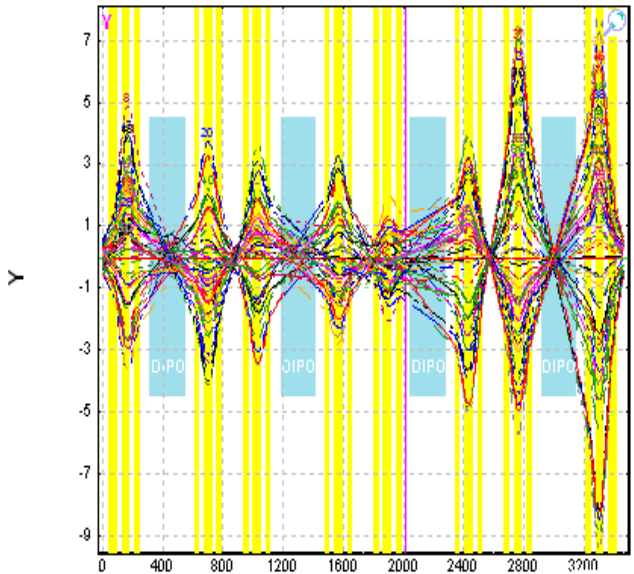
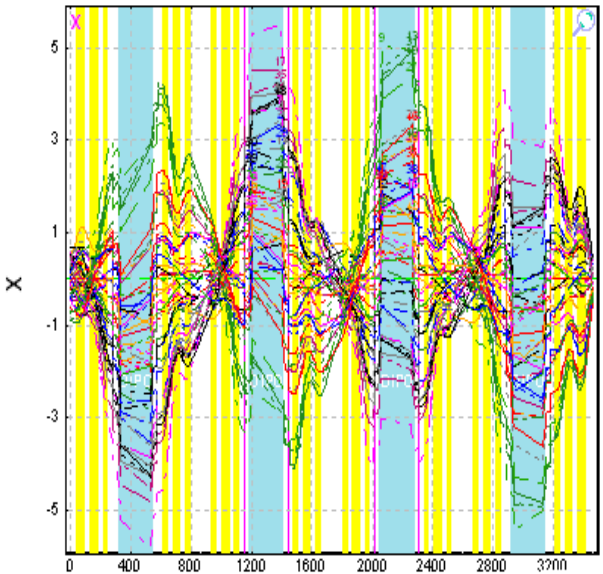
E^i distribution modification : YES Smoothing coefficient : 1.000

MOTER trace file: "a1900_08.motrace"



MOTER TRAJECTORY plot

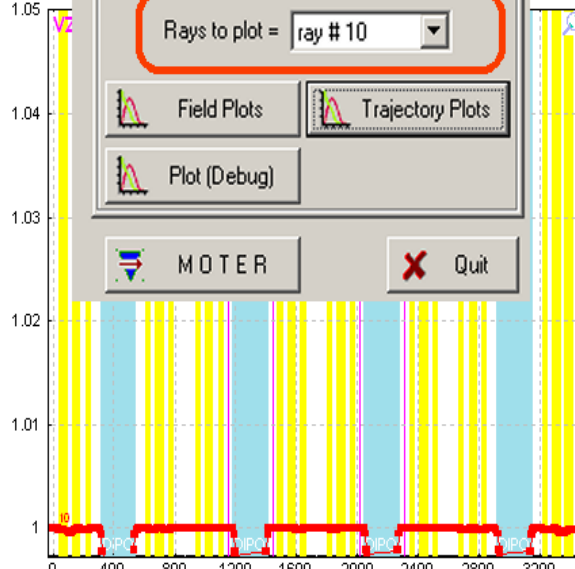
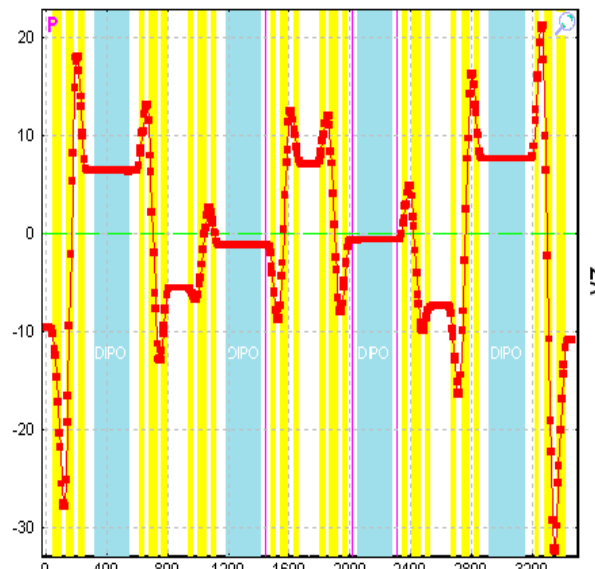
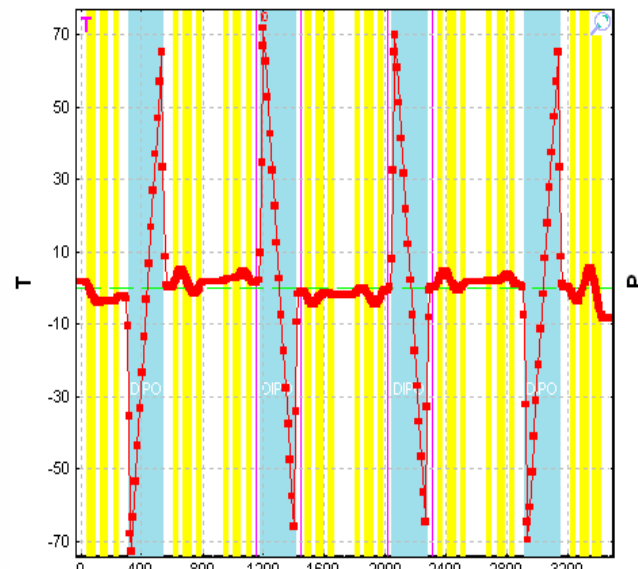
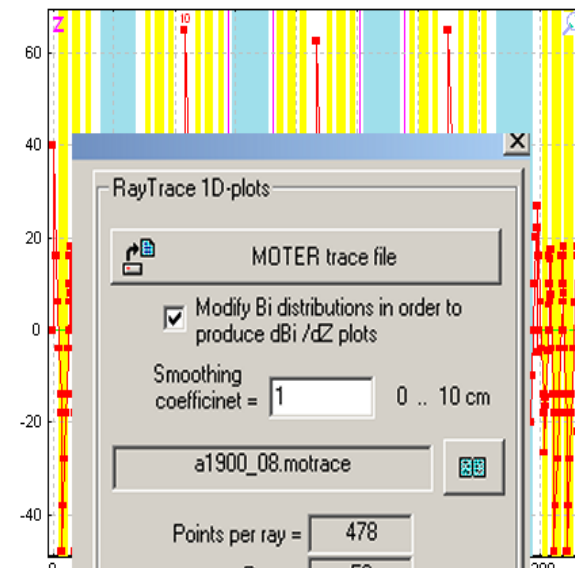
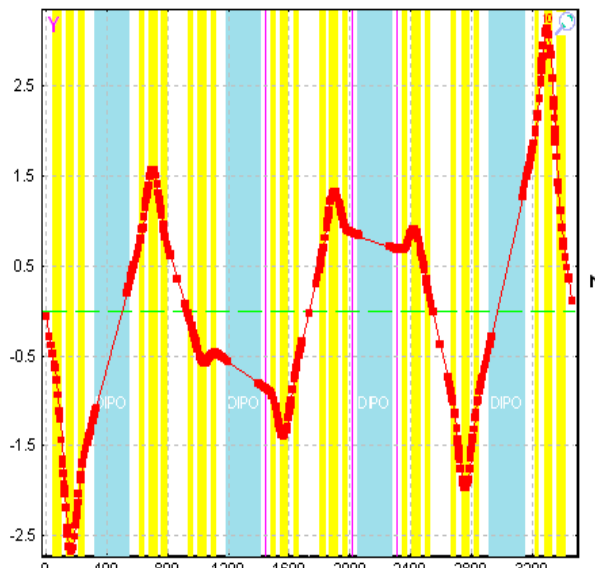
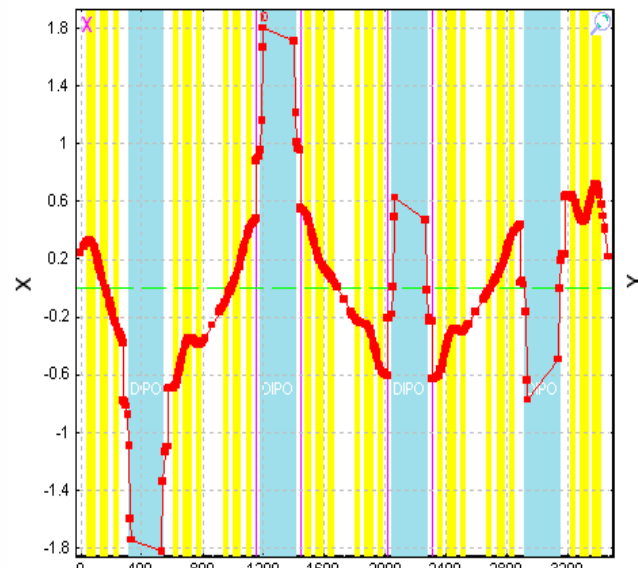
MOTER trace file: "a1900_08.motrace"



3.02e+3
5.48e+1

MOTER TRAJECTORY plot

MOTER trace file: "a1900_08.motrace"



RayTrace 1D-plots

MOTER trace file

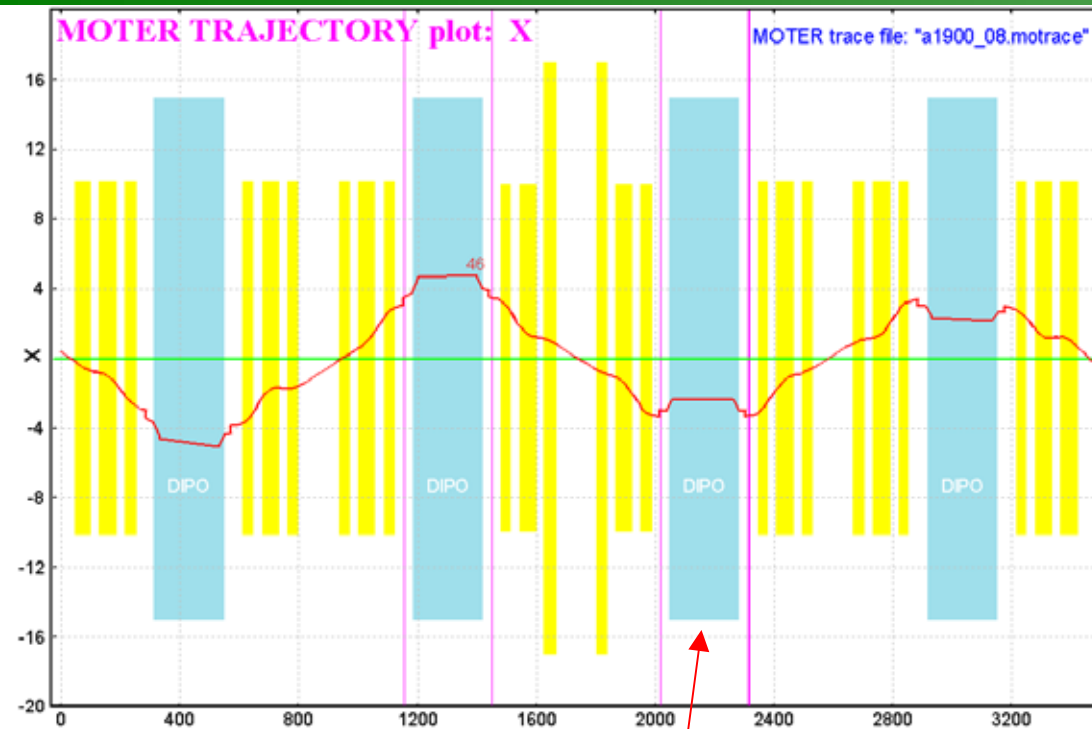
Modify Bi distributions in order to produce dBi /dZ plots

Smoothing coefficient = 0 .. 10 cm

Points per ray =

Rays =

Rays to plot =



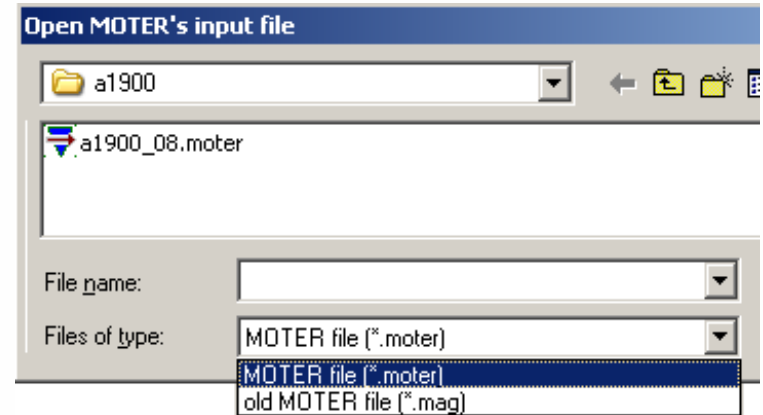
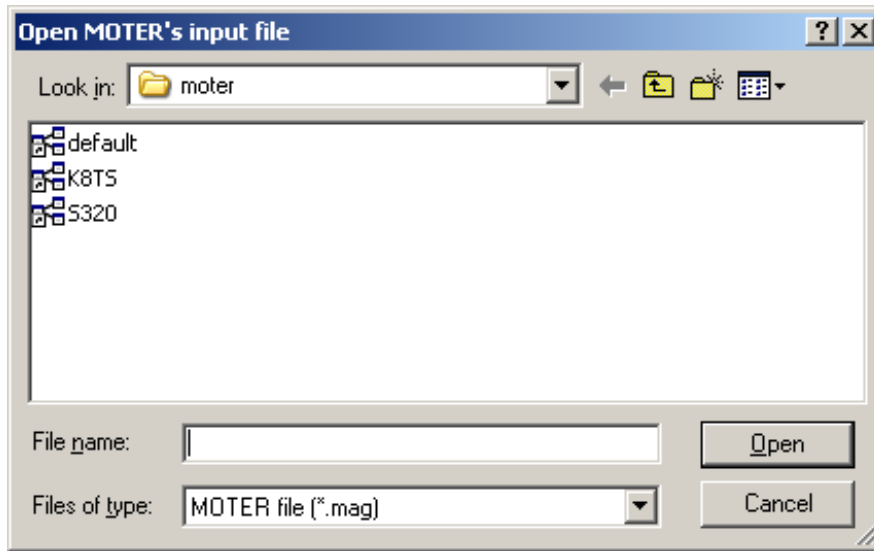
Element boundaries.
Use the "change axis scales" icon in LISE++
To visualize boundaries

Old-format project consists from three files

- Project.dem** - Demand File: this file defines the error functions for which the program will attempt to minimize
- Project.opt** - Optimization file: this file controls the optimization programs.
- Project.mag** - Magnet file: this file defines the magnetic system and the phase space to be simulated

New-format project consists just from one file with extension
“*.moter”

Which combine all former sections of project and new sections have been implemented (as well as future development).



Only “*.mag” files are shown. Files “dem” and “opt” are opened, and saved automatically with the “mag”-file.

You can read / write old-format files still / too



New file format (1)



```

MOTERfile
Version 2.1.6

;-----
[General]
File=C:\user\c\Moter_builder_2007\files\moter\al900\al900_08.moter
Date=16-07-2008
Time=23:19:33

;-----
[Settings]
Title=A1900_99 Test of Multipole magnets
NoRays=50
NP=10
NSKIP=1
doRandom=1
ICON=1
rand=0
doScat=0
Method (IOPT)=NOOP
IRANDUM=0
IRANSTA=0

;-----
[Beam]
Energy=9.5000e+02
RM=1.0000e+00
Charge=1.0000e+00

;-----
[Options]
NINDEPN1=1
ISET=1
DELTA=0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.01
LPRIMP=0 18 36 -1 0 0 0 0 0 -1
JRKSTMS=3
JHAMMING=1
IBMTYPE=1
NSIGMA=5
ISIGMA=1 1 1 1 0 1
RSIGMA1= 1.000e+00 1.000e+00 0.000e+00 0.000e+00 0.000e+00 0.000e+00 0.000e+00
RSIGMA2= 1.740e+01 0.000e+00 1.000e+00 0.000e+00 0.000e+00 0.000e+00 0.000e+00
RSIGMA3= 1.000e+00 0.000e+00 0.000e+00 1.000e+00 0.000e+00 0.000e+00 0.000e+00
RSIGMA4= 1.740e+01 0.000e+00 0.000e+00 0.000e+00 1.000e+00 0.000e+00 0.000e+00
RSIGMA5= 0.000e+00 0.000e+00 0.000e+00 0.000e+00 0.000e+00 1.000e+00 0.000e+00
RSIGMA6= 1.000e-01 0.000e+00 0.000e+00 0.000e+00 0.000e+00 0.000e+00 1.000e+00
SHOOT=0e+00 0e+00 0e+00 0e+00 0e+00 0e+00
TGTPAR=0e+00 0e+00 0e+00 0e+00 0e+00 4.36872e-01
RKXY=0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00
KRAY=1
KOUT=1
FRAC=1.00000
XTYP_offsets=0.0000e+00 0.0000e+00 0.0000e+00 0.0000e+00

```

```

Ray1=+0.0000e+00 +0.0000e+00 +0.0000e+00 +0.0000e+00 +0.0000e+00 +0.0000e+00 +0.0000e+00 +9.3150e+02
;-----
[Optimization1]
NPROBS=3
ITERS=1
NP0=1
NPRINT1=0
NPRINT2=0
NETASCH=0
MONO=0
NTABLE=4
NPIV=0
MXFCN=3
ICROW=1
KREAD=1
[Optimization2]
GRDZMIN=0.00000e+00
PHIMIN=1.00000e-09
ZSQMIN=-9.00000e+36
APZERO=0.00000e+00
CMIN=1.00000e-05
CMAX=1.00000e-01
[Optimization3]
RELPHI=1.00000e-20
RELPPHI=1.00000e+01
RELDGMX=1.05000e-10
ETAVREL=1.00000e-25
ETAHALT=1.50000e-15
USQMX=1.00000e+01

;-----
[Demand]
'DEMAND FILE FOR al900
0 1
1, 18, 1, 1, 1, 1.0, 0, 0.0, " "
1, 0, 6, 2, 0, 0.0, 0, 0.0, " "
1, 0, 6, 3, 0, 0.0, 0, 0.0, " "
1, 0, 6, 3, 0, 0.0, 0, 0.0, " "
1, 0, 6, 4, 0, 0.0, 0, 0.0, " "
1, 0, 6, 4, 0, 0.0, 0, 0.0, " "
1, 0, 6, 4, 0, 0.0, 0, 0.0, " "
0, 0, 5, 5, 0, 0.0, 0, 0.0, " "
0.1, 0, 0, 0.0
1, 18, 2, 1, 1, 1.0, 0, 0.0, " "
1, 0, 2, 2, 0, 0.0, 0, 0.0, " "
1, 0, 1, 3, 0, 0.0, 0, 0.0, " "
1, 0, 1, 4, 0, 0.0, 0, 0.0, " "
1, 0, 1, 4, 0, 0.0, 0, 0.0, " "
1, 0, 2, 5, 0, 0.0, 0, 0.0, " "
1, 0, 2, 5, 0, 0.0, 0, 0.0, " "
0, 0, 5, 6, 0, 0.0, 0, 0.0, " "
1.0, 0, 0, 0.0
1, 18, 3, 1, 1, 1.0, 0, 0.0, " "
0, 0, 5, 2, 0, 0.0, 0, 0.0, " "
0.1, 0, 0, 0.0
1, 36, 1, 1, 1, 1.0, 0, 0.0, " "
0, 0, 5, 2, 0, 0.0, 0, 0.0, " "

```



```
;-----  
[Elements]  
QUAD {Quadrupole} =====  
2 2 2  
40 9.9 66 10 0.970032  
16 -16 -16 16  
0.2623 5.662 -2.9586 2.1928 -0.63215 -0.037313  
0.2623 5.662 -2.9586 2.1928 -0.63215 -0.037313  
10.16 10.16 0 10.16 10.16  
0 0 0 0  
0 0 0 0  
0 0 0 0.0. ! last line  
QUAD {Quadrupole} =====  
2 2 2  
9.9 9.9 66 10 -0.8786  
16 -16 -16 16  
0.2623 5.662 -2.9586 2.1928 -0.63215 -0.037313  
0.2623 5.662 -2.9586 2.1928 -0.63215 -0.037313  
10.16 10.16 0 10.16 10.16  
0 0 0 0  
0 0 0 0  
0 0 0 0.0. ! last line  
QUAD {Quadrupole} =====  
2 2 2  
9.9 26.94 44.6 10 0.460839  
16 -16 -16 16  
0.2623 5.662 -2.9586 2.1928 -0.63215 -0.037313  
0.2623 5.662 -2.9586 2.1928 -0.63215 -0.037313  
10.16 10.16 0 10.16 10.16  
0.018262 0 0 0  
0.018262 0 0 0  
0 0 0 0.0. ! last line  
DIPO {Dipole} =====  
309.91  
2 2 2 0.1 0  
26.94 26.94 10.16 1.0225  
45 0 0  
0 0 0 0 0 0  
20 -20 -20 20  
0 0 0 0  
0 0 0 0  
-0.4 -0.4 0 0  
0 0 0 0  
0 0 0 0  
0.12994 2.6506 -0.794226 0.00679 0.3215 0.0642  
0.12994 2.6506 -0.794226 0.00679 0.3215 0.0642  
4.5 15 0  
0 0 0 0  
0 0 0 0.0. ! last line  
QUAD {Quadrupole} =====  
2 2 2  
26.94 9.91 44.6 10 0.558355  
16 -16 -16 16  
0.2623 5.662 -2.9586 2.1928 -0.63215 -0.037313  
0.2623 5.662 -2.9586 2.1928 -0.63215 -0.037313  
10.16 10.16 0 10.16 10.16
```

```
0.083797 -0.022581 0 0 0  
0.083797 0 0 0  
0 0 0 0.0. ! last line  
QUAD {Quadrupole} =====  
2 2 2  
9.91 9.91 66 10 -0.842082  
16 -16 -16 16  
0.2623 5.662 -2.9586 2.1928 -0.63215 -0.037313  
0.2623 5.662 -2.9586 2.1928 -0.63215 -0.037313  
10.16 10.16 0 10.16 10.16  
-0.082168 -0.003249 -0 0 -0  
-0.082168 0 0 0  
0 0 0 0.0. ! last line  
QUAD {Quadrupole} =====  
2 2 2  
9.91 65.03 44.6 10 0.59324  
16 -16 -16 16  
0.2623 5.662 -2.9586 2.1928 -0.63215 -0.037313  
0.2623 5.662 -2.9586 2.1928 -0.63215 -0.037313  
10.16 10.16 0 10.16 10.16  
0 0 0 0  
0 0 0 0  
0 0 0 0.0. ! last line  
FOCL {FocL} =====  
0 0 0 10.16 10.16  
0 0 0 0.0. ! last line  
QUAD {Quadrupole} =====  
2 2 2  
65.03 9.91 44.6 10 0.59324  
16 -16 -16 16  
0.2623 5.662 -2.9586 2.1928 -0.63215 -0.037313  
0.2623 5.662 -2.9586 2.1928 -0.63215 -0.037313  
10.16 10.16 0 10.16 10.16  
0 0 0 0  
0 0 0 0  
0 0 0 0.0. ! last line  
QUAD {Quadrupole} =====  
2 2 2  
9.91 9.91 66 10 -0.842082  
16 -16 -16 16  
0.2623 5.662 -2.9586 2.1928 -0.63215 -0.037313  
0.2623 5.662 -2.9586 2.1928 -0.63215 -0.037313  
10.16 10.16 0 10.16 10.16  
-0.082168 -0.003249 -0 0 -0  
-0.082168 0 0 0  
0 0 0 0.0. ! last line  
QUAD {Quadrupole} =====  
2 2 2  
9.91 26.94 44.6 10 0.558355  
16 -16 -16 16  
0.2623 5.662 -2.9586 2.1928 -0.63215 -0.037313  
0.2623 5.662 -2.9586 2.1928 -0.63215 -0.037313  
10.16 10.16 0 10.16 10.16  
0.083797 -0.022581 0 0 0  
0.083797 0 0 0  
0 0 0 0.0. ! last line  
SHRT {Shrout} =====
```

“MOTER.INI” file is located in the LISE++ root directory or in the MyDocuments\user\LISE directory, if the user does not have administrative privileges.

Right now there are just two keys kept in the file

```

Lister - [c:\user\c\Moter_builder_2007\moter.ini]
File Edit Options Help 100 %
[Preferences]
DefaultFile=a1900\a1900_08.moter
LISEcode=C:\Program Files\LISE\
    
```

MOTER7 - a1900_08

Project Help

Preferences Optimization Demand Magnet1 Magnet2 Elements FileLogs Results

Variables	Value
Starting file at loading the program	a1900\a1900_08.moter
LISE++ code path	C:\Program Files\LISE\

OLD

```

for (J=1; J<=10; J++)
{
    double DELTAZ = ptr84.A0 + DT1 * (ptr84.A1 + D
    DELTAZ = DELTAZ + TANA * (B0 + DT1 * (B1 + DT1 * (B2
    double SLOPE = ptr84.A1 + DT1 * (2. * ptr84.A2 + DT1
    SLOPE += TANA * (B1 + DT1 * (2. * B2 + DT1 * 3. * B3);
    if (fabs(SLOPE) < 1.e-20) SLOPE = 1.e-20;
    double CHANGE = DELTAZ / SLOPE;
    DT1 -= CHANGE;
    if (fabs(CHANGE) < 1.e-6) goto metka4020.
}
    
```

```

printf(Formats[14]);
goto metka4099;
    
```

```

metka4020:
// COMPUTE TC@S AT DT1
for (int i=0; i<6; i++)
{
    HATINT(i+1, J1, DTF2);
    TC[0].Set(i, ptr84.A0 + DT1 * (ptr84.A1 + DT1 * (ptr8
}
    
```

```

metka4099:
if (IHAT < 20) printf("\n TC FINAL= %15.6 %15.6 %15.6 %15.6
TC[0].X(), TC[0].Y(), TC[0].Z
    
```

```

// Do not transform to output system for stopping pole
goto metka7052;
    
```

```

metka7051:
// Transform to output system coord.
    
```

NEW

```

//===== START =====
//
// if ptr->status=-1. start from target system, transform to ent
if (ptr->status < 0) Dipole_StartFromTarget(ptr);
else Dipole_SecondStart(ptr);

//=====
// VFB1
switch (Dipole_VFB1(ptr))
{
    case enZtest : goto metka7071_enZtest;
    case en_Overlapping_fringing : goto metka53_Overlapping
    case en_UniformField : goto metka3055_UniformFi
    case enFinished : // keep going;
    default : break;
};

//-----
// VFBA

if (Dipole_VFBA(ptr) != enZbreak) goto metkaERR99;

if (! Verbose) { PRNT_TC_BX33(); printf(Formats6, dipData2.step);}

if (ptr->Z12 >= TC[0].Z()) goto metka51_NonUniformCentral;

//=====
// Overlapping fringing field region

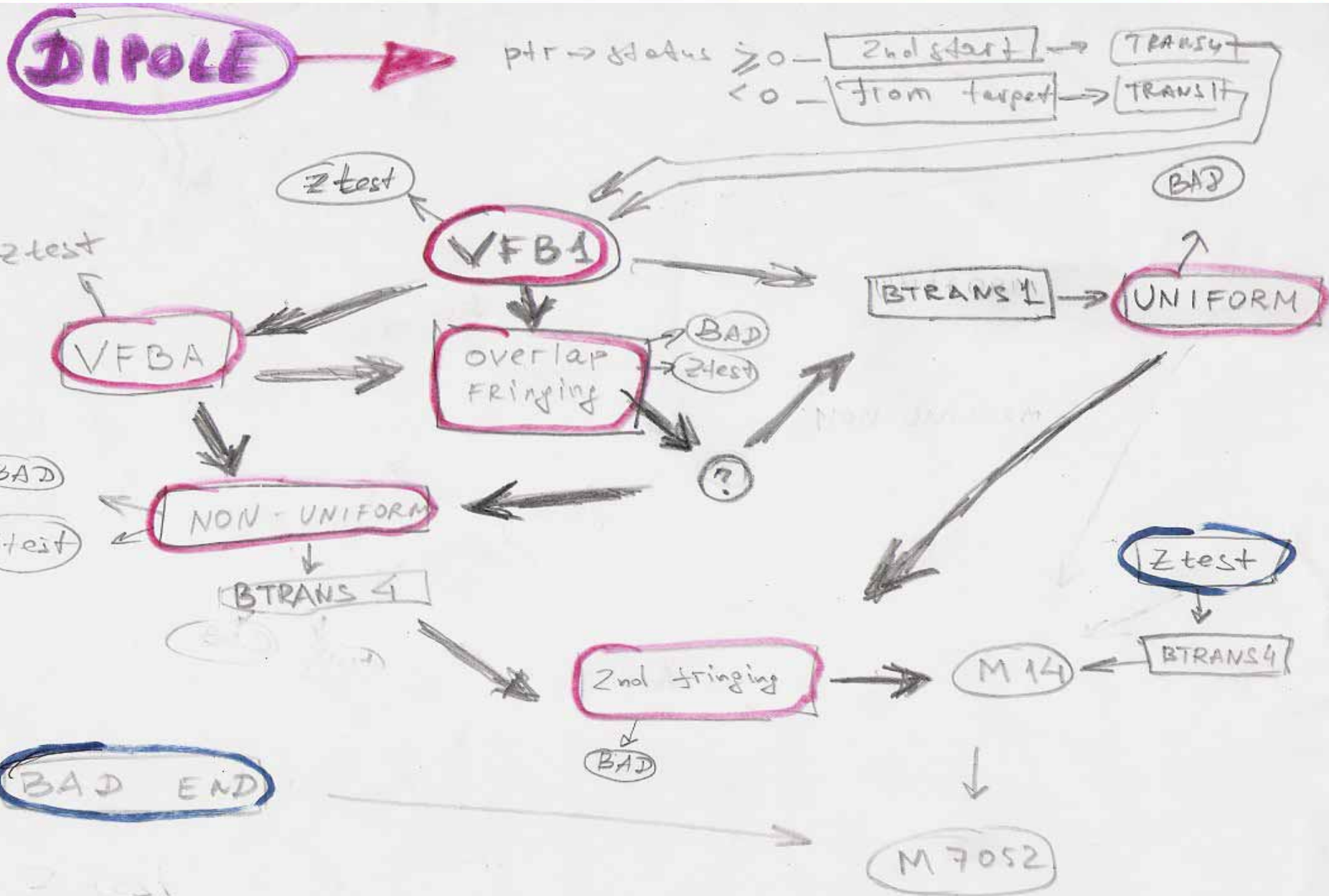
metka53_Overlapping_fringing:

switch (Dipole_Overlap(ptr))
{
    case enZtest : goto metka7071_enZtest;
    case enFinished : goto metkaERR99;
    case enZbreak : // keep going
    default : break;
};

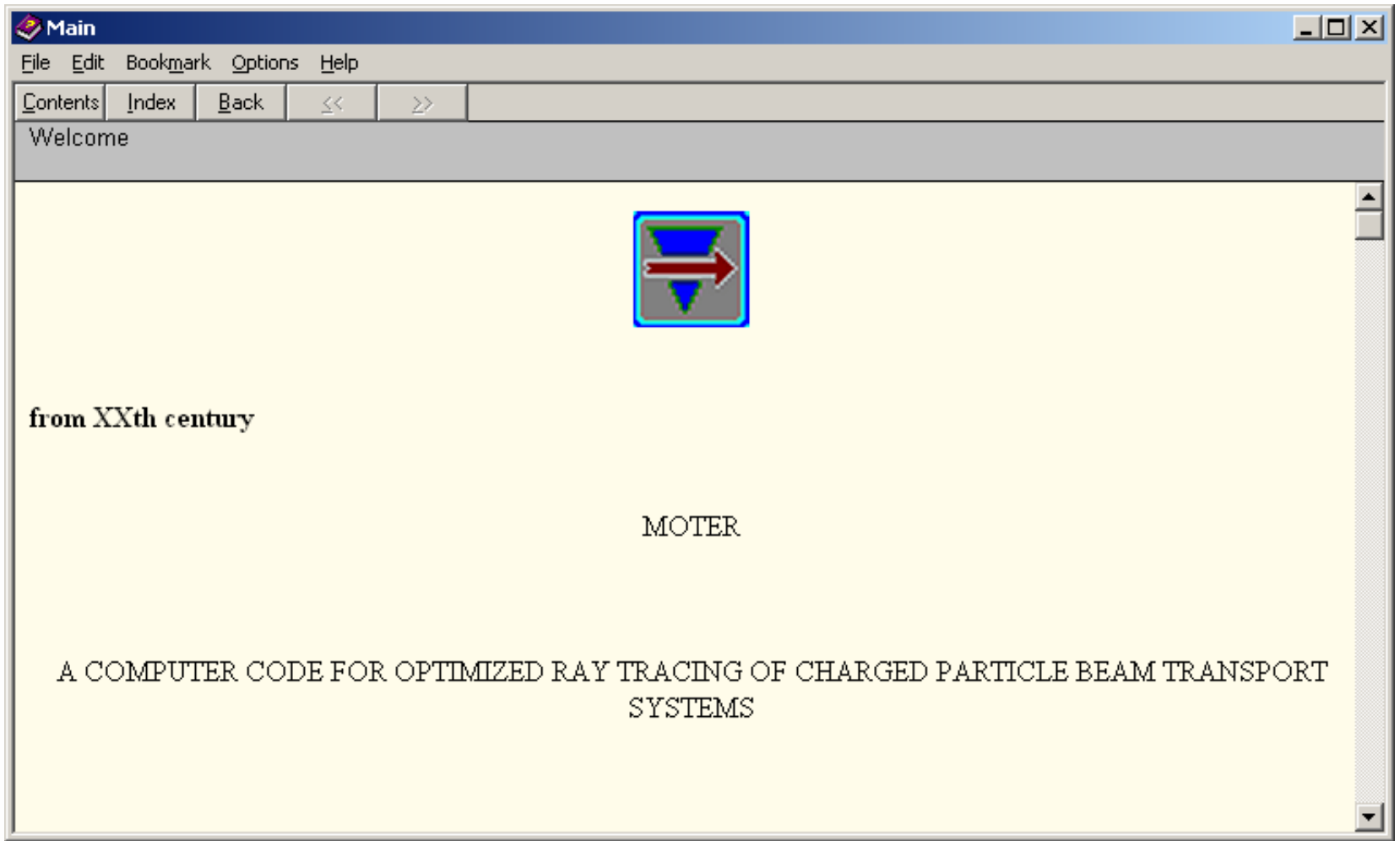
//=====
metka51_NonUniformCentral:
    
```

Trying to avoid “goto metka***” operands,
 Split huge text blocks to subroutines.
 Erase repeated block,
 optimize them to one subroutine.

"Dipole Block" Module



Should be recompiled with other Help-maker program !



[/ LISE / moter.hlp](#)

LISE

SIMULATION OF FRAGMENT SEPARATORS

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MOTER : raytracing code for MS Windows

MOTER is a raytracing-type program for magnetic optic system design. It is roughly based on the program RAYTRACE, and includes the capability of optimizing system parameters (one of few sections of the MOTER manual which is correct describes the optimization features of MOTER). The user can define an error function which the program will minimize. The program simulates the optical phase space by picking rays at random within a user defined region. Fixed rays can also be input.

MOTER is a ray tracing program intended for analysis and optimization of systems of magnetic elements. Several features are included in MOTER which are not available in other codes. Among these are Monte Carlo simulation of the beam phase space, a sophisticated definition of the performance including the possibility of computer correction of aberrations based on measurements of the trajectory of each event, the automatic optimization of any parameter of the magnet system, the possibility of the use of field maps for dipoles, quadrupoles, and multipoles, and the availability of several new element types including an ExB separator, an r.f. accelerating gap, a wedge degrader, and various slits and scatterers. To the greatest possible extent, MOTER makes use of the definition of parameters identical of program RAYTRACE. In order to minimize the pitfalls of problem setup, it is suggested that the MOTER user first study his problem with the standard codes TRANSPORT, TURTLE, and RAYTRACE, in that order. The history of the evolution of MOTER is useful for understanding some of the details of the coding. Starting with the 1969 version of RAYTRACE, written by S.Kowalski and H.Engel of MIT, the following sequence of additions and modifications occurred....

under construction

**Should be updated soon
based on these presentations**

1. Run the “Optimization (minimization)” procedure
2. Matrix creation as option
3. Source optimization, debugging
 (“LSM.DATA” array (double [1 320 000]) should me modified, and so on, limitation for number of elements and particles should be eliminated)
4. The “MAP” procedure restore
5. Help, Documentation, “About” dialog
6. Spectrometer scaling (tuning)
7. MOTER element optimization and implementation of new ones
8. LISE++ & MOTER configuration exchanges and so on...