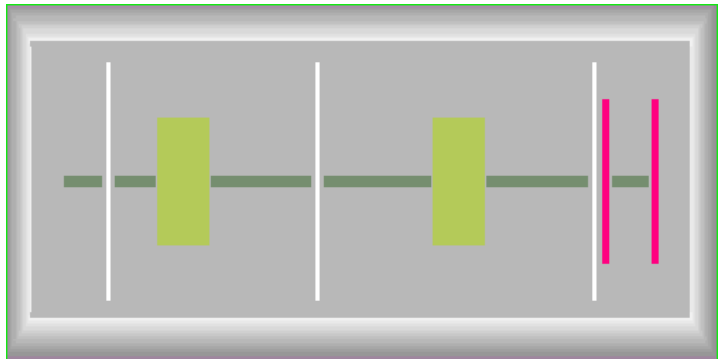
“Solenoid” block update and “TwinSol” configuration

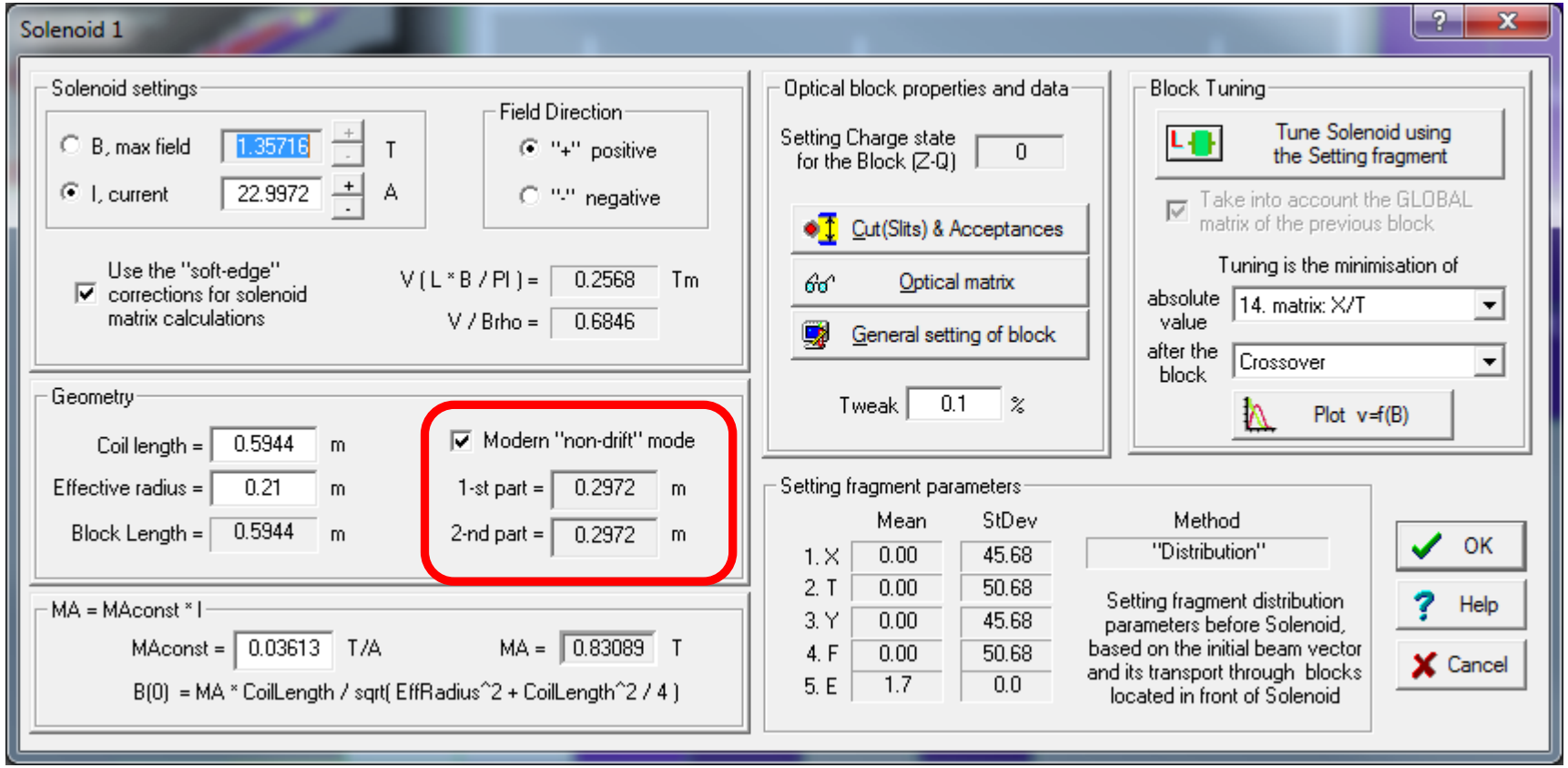
v.9.10.361
from 10/14/16

v.9.10.377
from 11/07/16
update



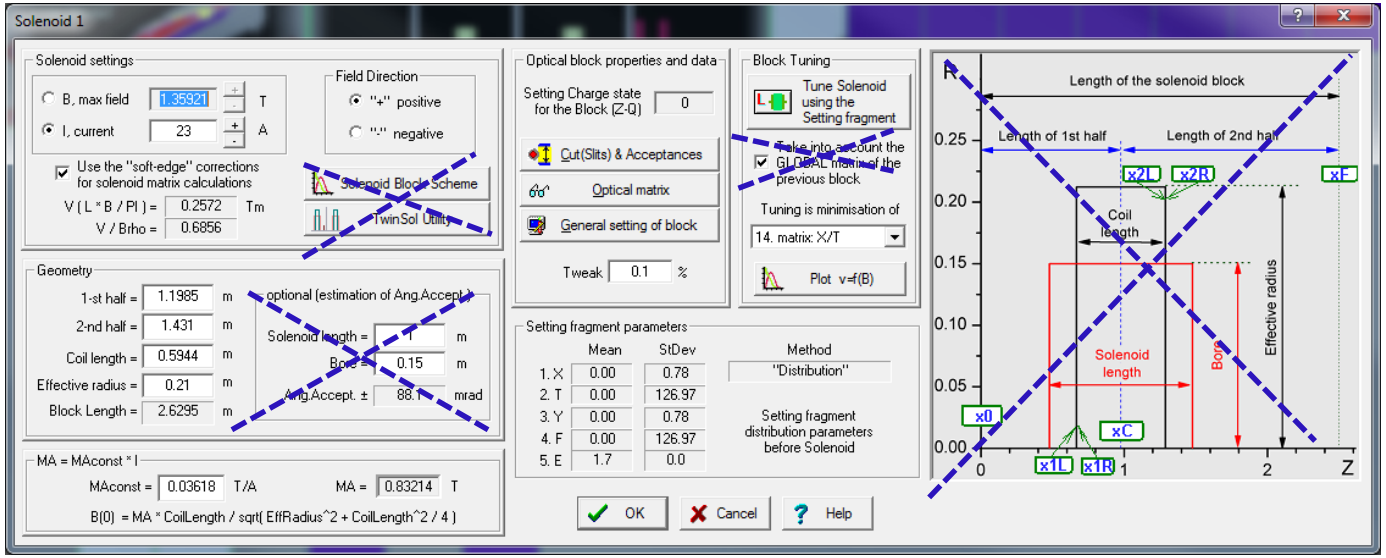
1. “The “Solenoid” block : no more drifts
2. “The “Solenoid” block dialog modification
3. TwinSol configuration in LISE^{++} package
4. TwinSol utility update
5. Two peaks at Envelopes
6. Are there two peaks with Twinsol the utility?

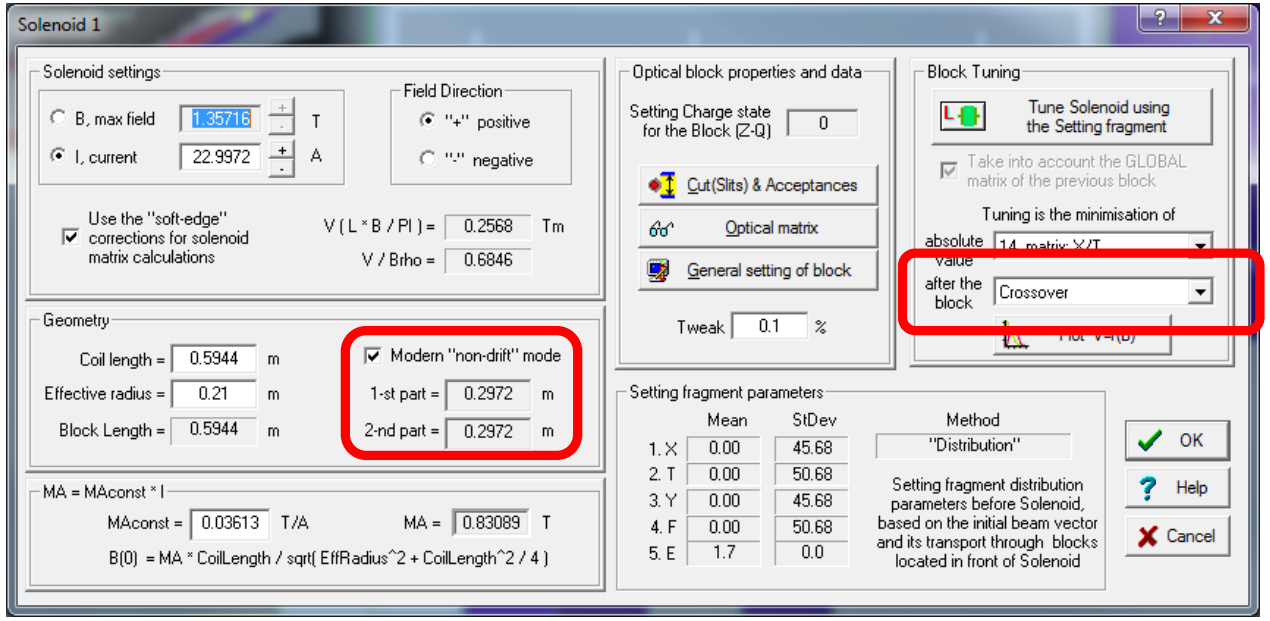
"The "Solenoid" block : no more drifts



In the previous version it was impossible to insert an additional block (slits, material and so on) between solenoid drift and solenoid core itself., or to set their apertures independently

"The "Solenoid" block dialog modification





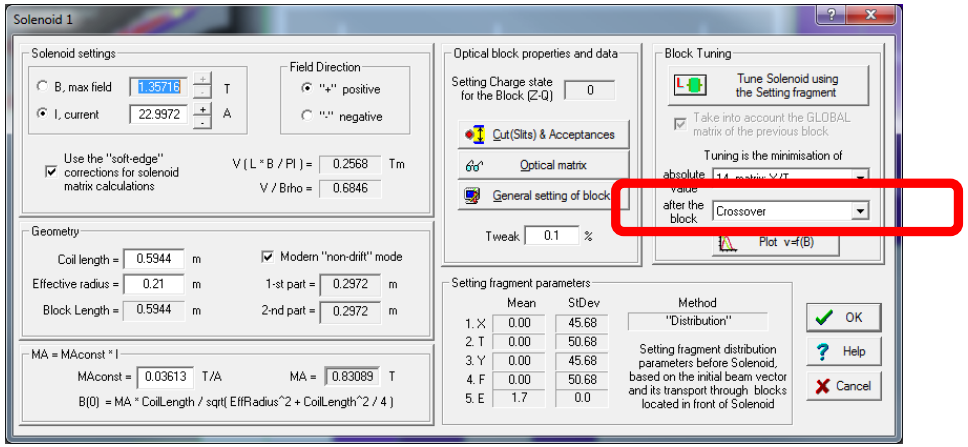
"Old"
v.9.9

The "old" solenoid block dialog was based on classical solenoid properties from the TwinSol utility. Solenoid tuning was done with a matrix after the solenoid, what assumed drift existence in the solenoid block.

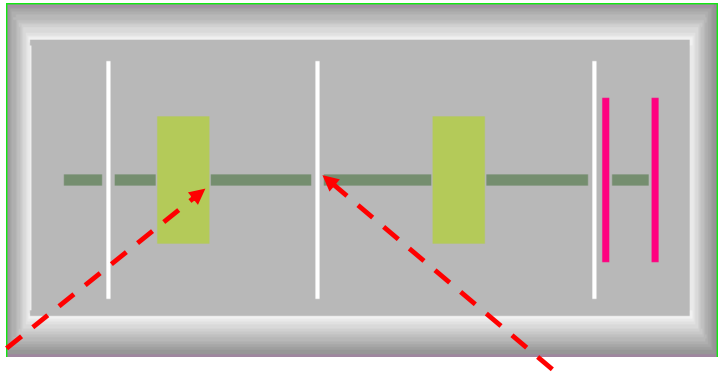
The new" solenoid block allows to select a block which map matrix will be used for tuning.

"New"
v.9.10.361

"The "Solenoid" block dialog modification: block selection for tuning



The new" solenoid block allows to select a block which map matrix will be used for tuning.

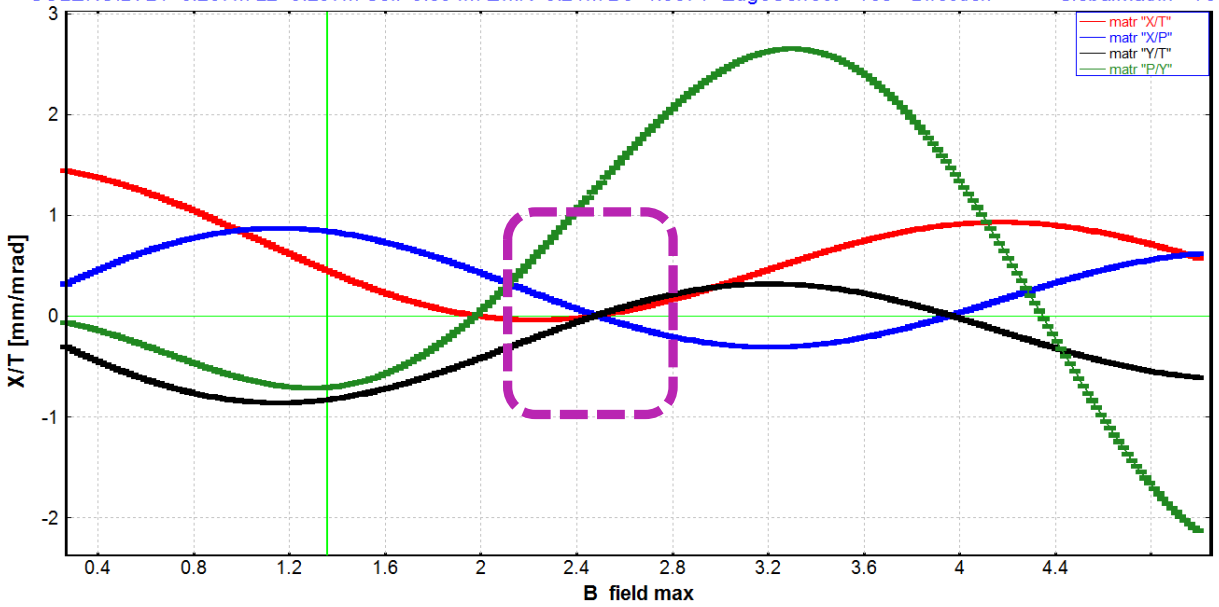


Solenoid block tuning: X/T [mm/mrad]

Tuning Parameter is <Matrix coefficients>: "14. matrix: X/T"; Tuning is after the "Solenoid 1" block

$^4He^{2+}$ (E=1.69 MeV/u or Ptrans=0.112 GeV/c) Emittance:45.68,50.68,45.68,50.68 Init.Ray:0,0,0,0

SOLENOID: L1=0.297m L2=0.297m Coil=0.594m Eff.R=0.21m B0=1.357T EdgeCorrect="Yes" Direction="+" GlobalMatrix="Ye

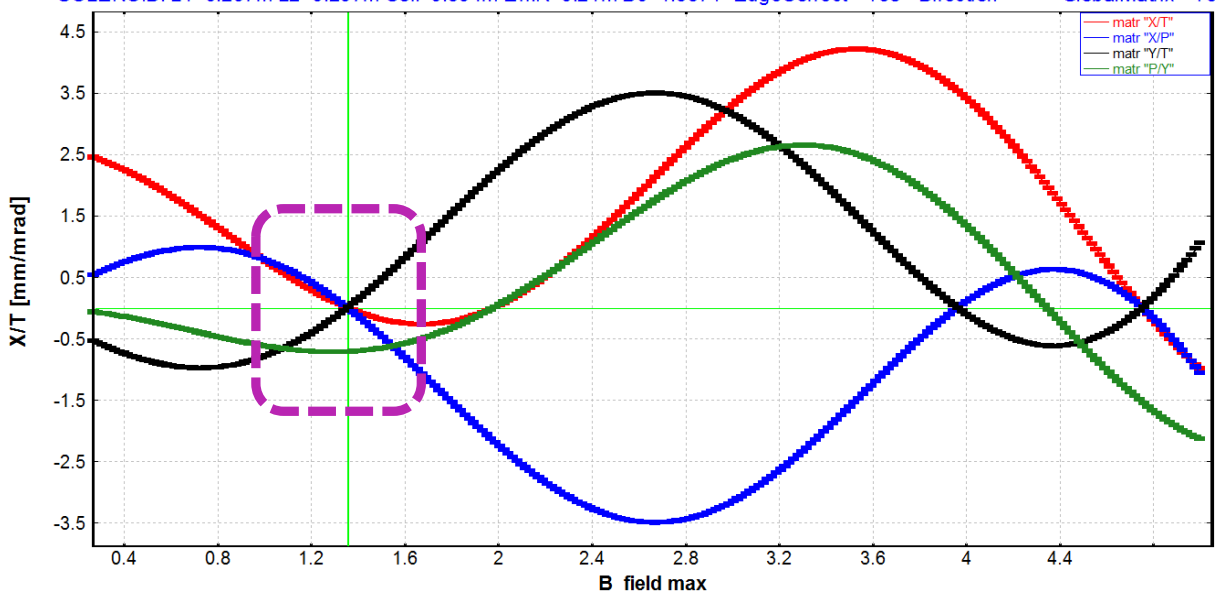


Solenoid block tuning: X/T [mm/mrad]

Tuning Parameter is <Matrix coefficients>: "14. matrix: X/T"; Tuning is after the "Crossover" block

$^4He^{2+}$ (E=1.69 MeV/u or Ptrans=0.112 GeV/c) Emittance:45.68,50.68,45.68,50.68 Init.Ray:0,0,0,0

SOLENOID: L1=0.297m L2=0.297m Coil=0.594m Eff.R=0.21m B0=1.357T EdgeCorrect="Yes" Direction="+" GlobalMatrix="Ye

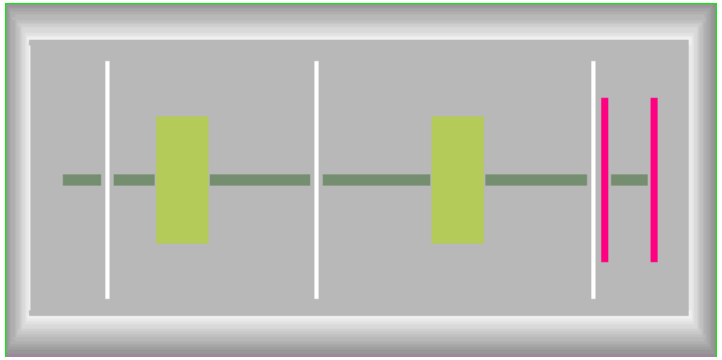


TwinSol configuration in LISE^{++} package

TwinSol configuration in LISE^{++} package

\config\other*.*

Name	↑Ext	Size	Date
[..]		<DIR>	10/14/2016
FMA	lcn	106,856	09/14/2015
one_dipole	lcn	5,537	08/25/2002
one_drift	lcn	6,029	08/25/2002
PRISMA	lcn	57,265	11/19/2014
RESOLUT_1gap	lcn	60,568	02/28/2013
RESOLUT_3gap	lcn	67,031	02/28/2013
TwinSol	lcn	55,171	10/14/2016



TwinSol working file in LISE^{++} package

\files\examples*.*

Name	↑Ext	Size	Date
[..]		<DIR>	10/14/2016
[afission]		<DIR>	04/06/2015
[Dubna]		<DIR>	06/02/2016
[GANIL]		<DIR>	11/30/2015
[GSI-SFRS]		<DIR>	04/06/2015
[NSCL]		<DIR>	05/24/2016
[RESOLUT]		<DIR>	04/06/2015
[RIKEN]		<DIR>	04/06/2015
[SECAR]		<DIR>	09/16/2015
[TAMU]		<DIR>	04/06/2015
[TRIUMF]		<DIR>	06/02/2016
Input MC rays	inrays	27,475	04/11/2013
CoulombFissionExample	lpp	116,538	12/29/2014
de_e_test	lpp	64,174	12/29/2014
FITconstraints	lpp	28,118	05/06/2015
FMA_32S_58Ni	lpp	173,157	06/07/2016
PRISMA	lpp	82,331	11/19/2014
TwinSol	lpp	75,327	10/14/2016

Aperture and slits should set correctly!!!
Angular acceptance should be deduced in order to use this configuration properly in the “Distribution” mode

Optics settings (fast editing)

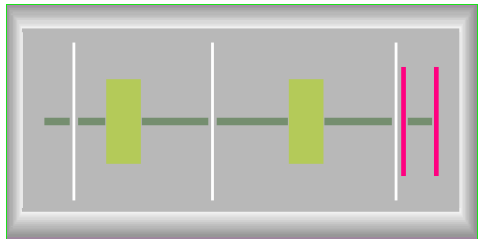
Block	Given Name	Start(m)	Length(m)	B0(kG)/*U	Br(Tm)cor/*real	DriftM/*Angle	Rapp(cm)/*R(m)	Leff(m)/*Ldip(m)	2 nd order	CalcMatr/*Z-Q	AngAcc,Apps,Slits	COSY I	SE
drift	Drift 1	0.000	0.4325			standard					-- -- --	-	e
slits	Slit 1	0.432	0.0000			SLITS					-- HV HV	-	e
drift	before Sol1	0.432	0.4688			standard					-- HV --	-	e
Solenoid	Solenoid 1	0.901	0.5944	1.3572 T	0.3751		Eff 0.210	Coil 0.594	-	*0	-- HV --	-	e
drift	after Sol1	1.496	1.1338			standard					-- HV --	-	e
slits	Crossover	2.630	0.0000			SLITS					-- HV HV	-	e
drift	bef Sol2	2.630	1.2078			standard					-- HV --	-	e
Solenoid	Solenoid 2	3.837	0.5944	1.2691 T	0.3751		Eff 0.210	Coil 0.594	-	*0	-- HV --	-	e
drift	after Sol2	4.432	1.1398			standard					-- HV --	-	e
slits	Slits 2	5.572	0.0000			SLITS					-- HV HV	-	e
drift	last	5.572	0.4220			standard					-- -- --	-	e

TwinSol configuration in LISE^{++} package

TwinSol working file in LISE^{++} package

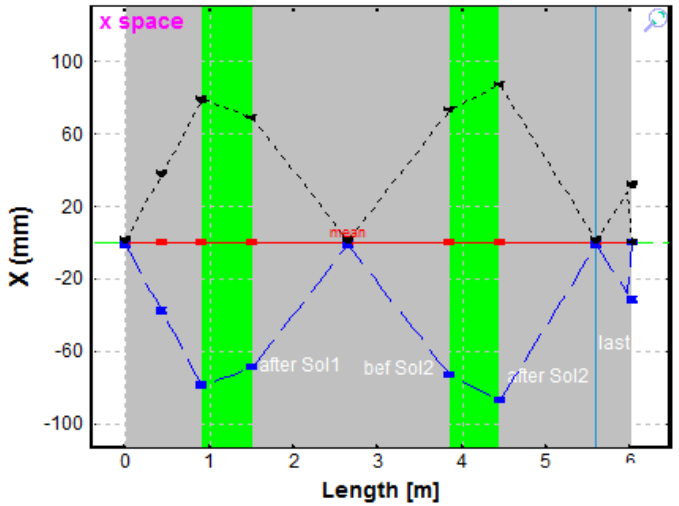
\files\examples*.*

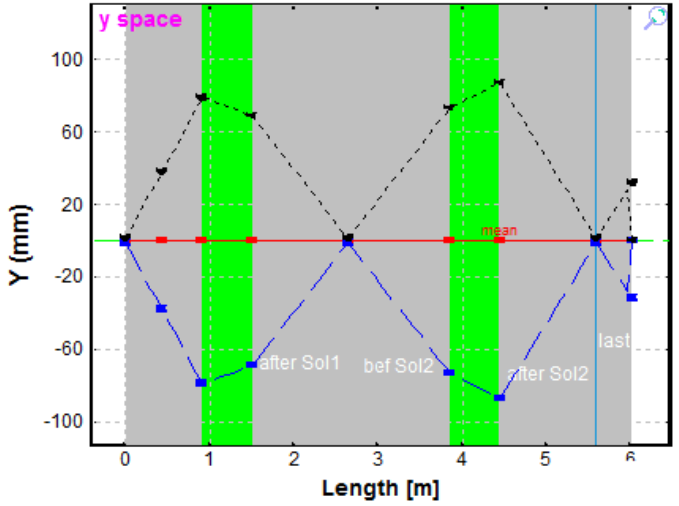
Name	↑Ext	Size	Date
[..]		<DIR>	10/14/2016
[afission]		<DIR>	04/06/2015
[Dubna]		<DIR>	06/02/2016
[GANIL]		<DIR>	11/30/2015
[GSI-SFRS]		<DIR>	04/06/2015
[NSCL]		<DIR>	05/24/2016
[RESOLUT]		<DIR>	04/06/2015
[RIKEN]		<DIR>	04/06/2015
[SECAR]		<DIR>	09/16/2015
[TAMU]		<DIR>	04/06/2015
[TRIUMF]		<DIR>	06/02/2016
Input MC rays	inrays	27,475	04/11/2013
CoulombFissionExample	lpp	116,538	12/29/2014
de_e_test	lpp	64,174	12/29/2014
FITconstraints	lpp	28,118	05/06/2015
FMA_32S_58Ni	lpp	173,157	06/07/2016
[illegible]	lpp	[illegible]	[illegible]
TwinSol	lpp	75,327	10/14/2016



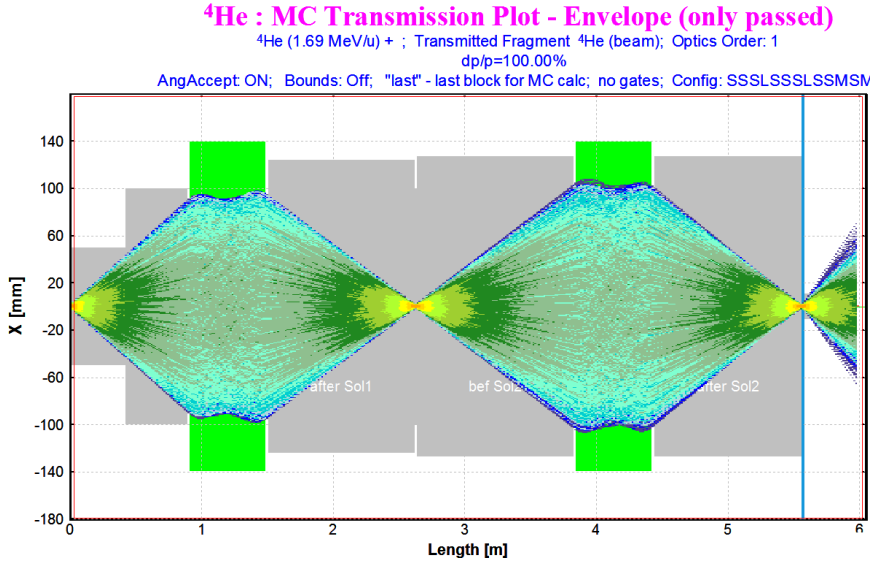
Analytical solution

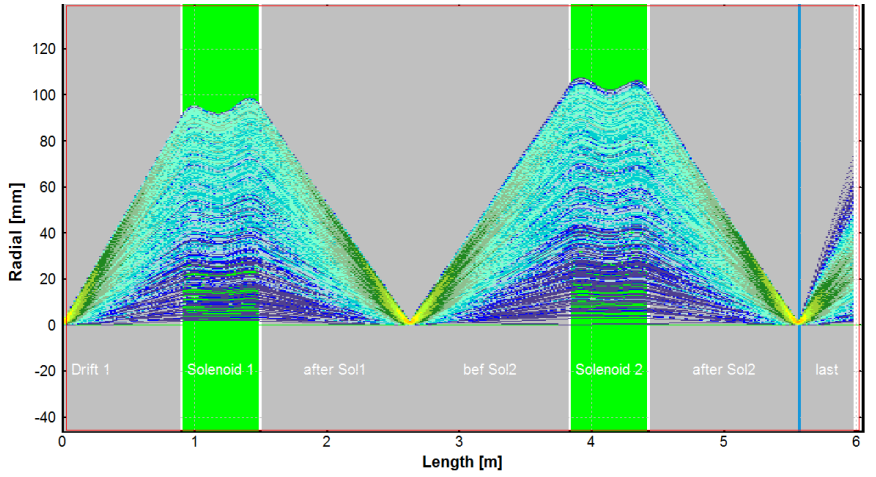
node: U=3.4e+03 KV; Settings on ^{4}He; Con
dp/p=100.00%



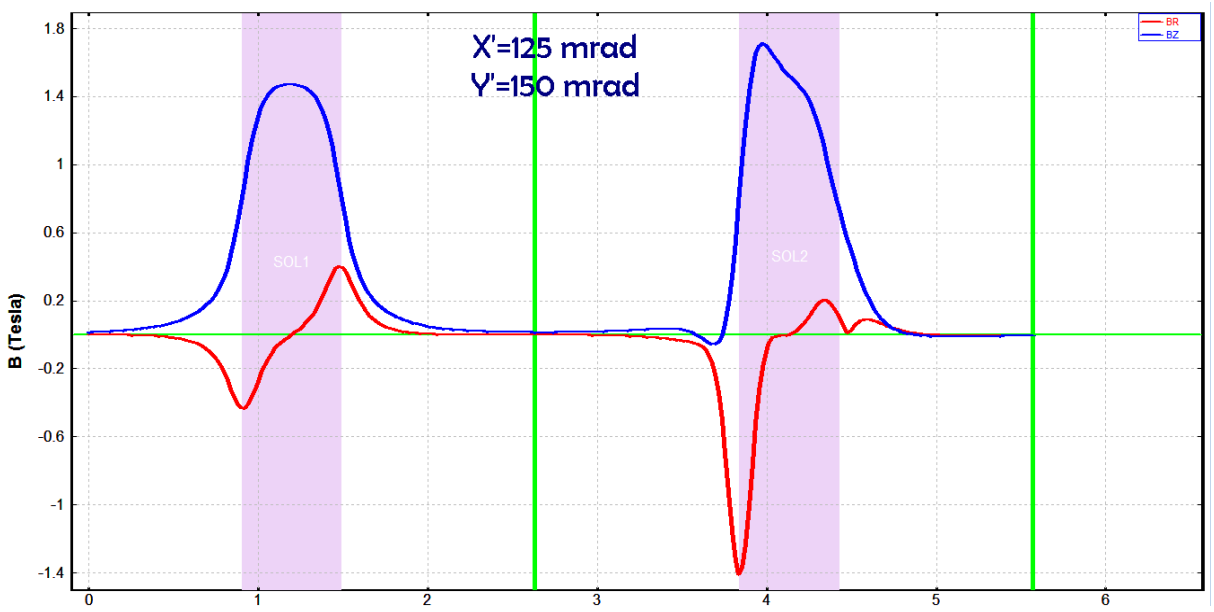


Monte Carlo solution

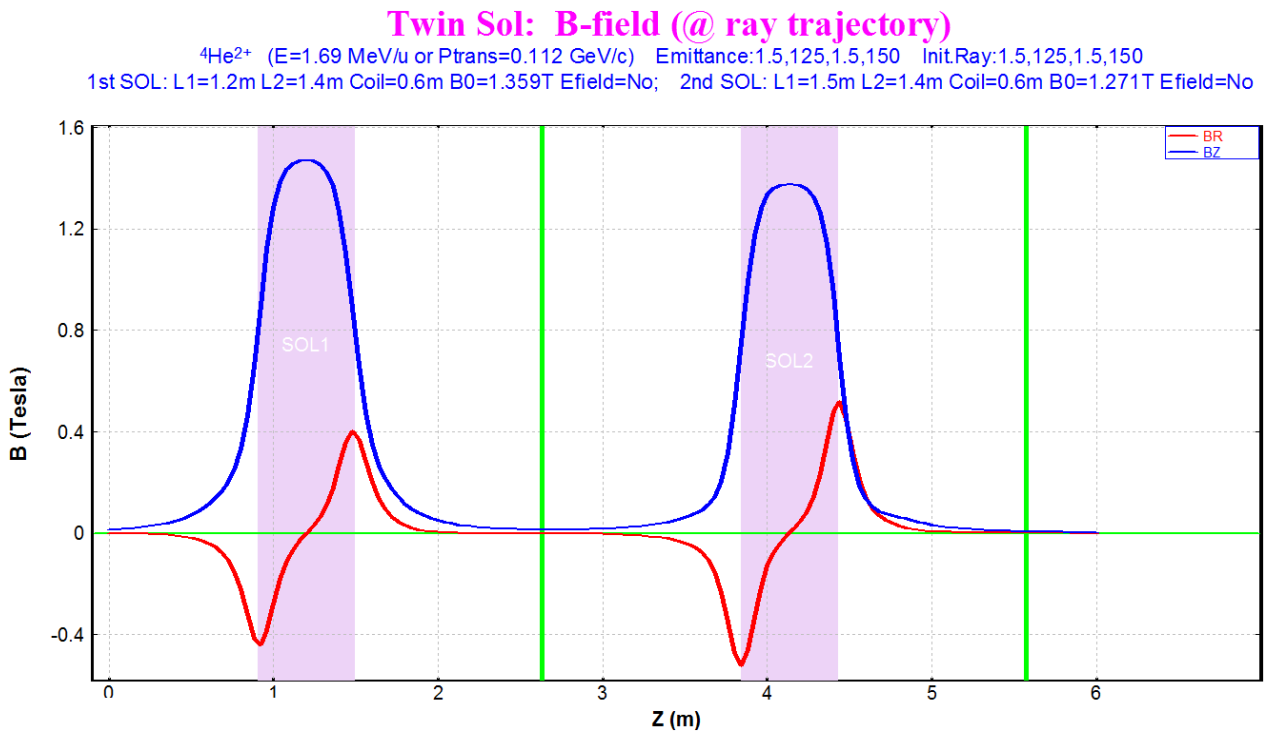




TwinSol utility update



v.9.10.354
Should be corrected!



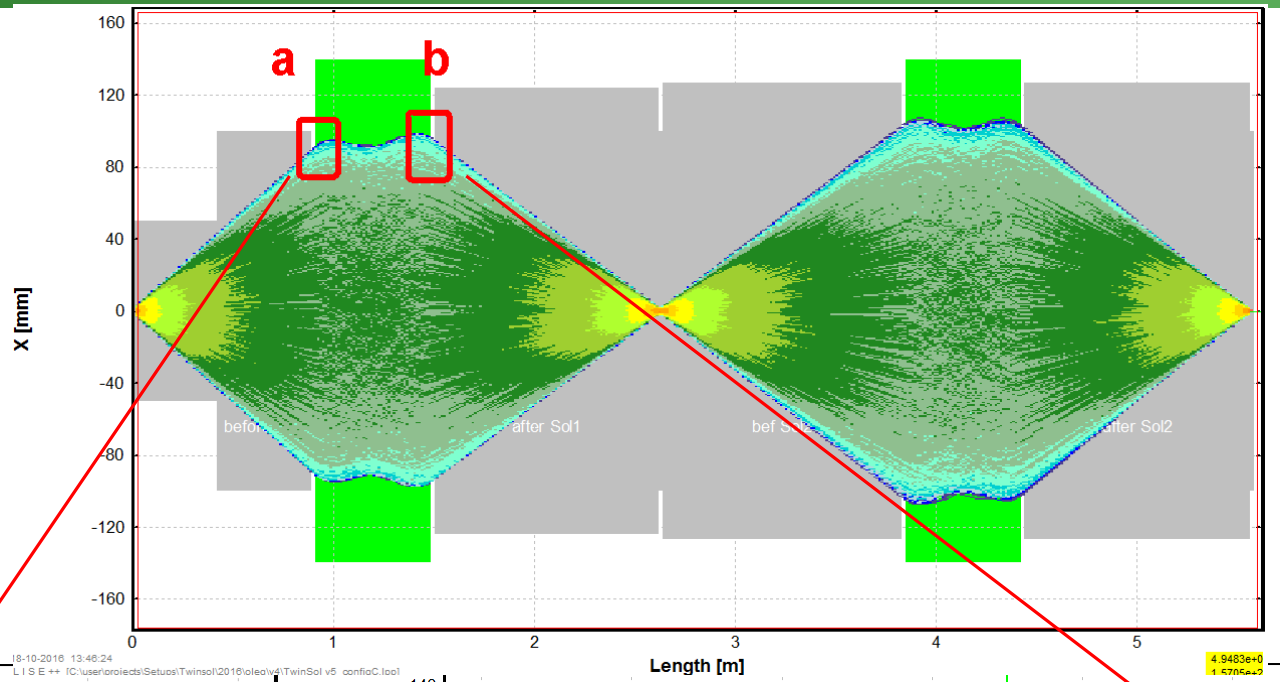
v.9.10.361
Modified!

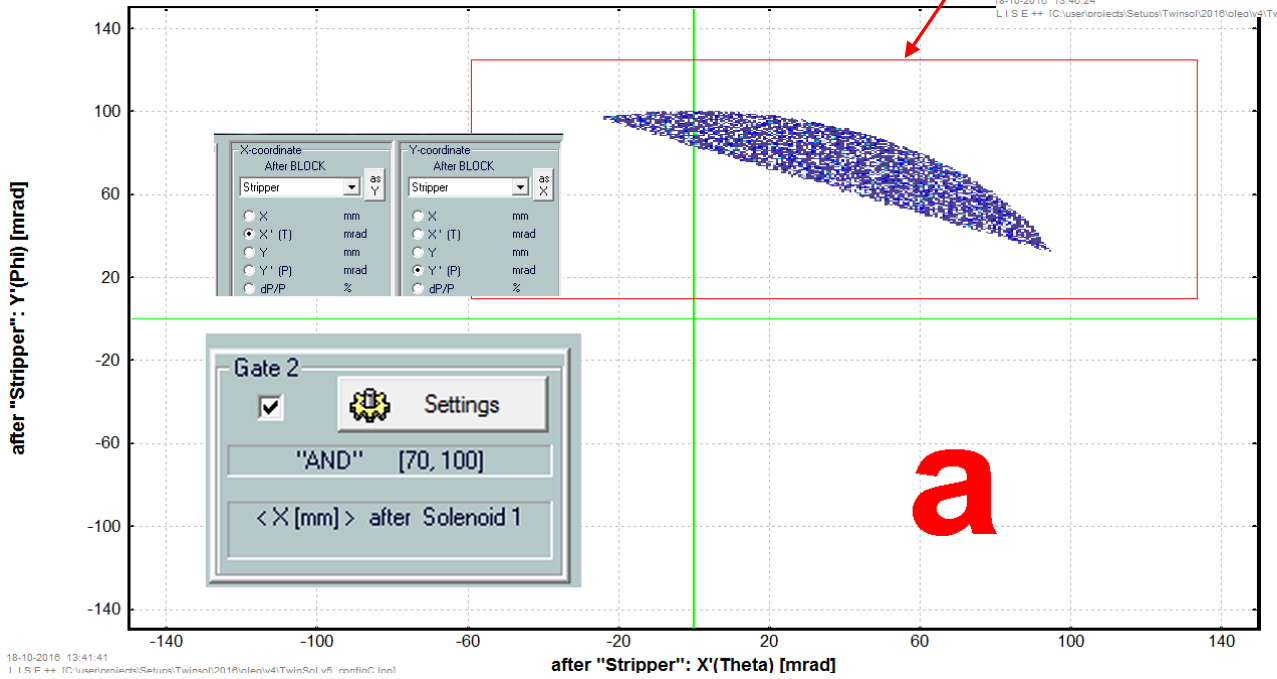
It happened if *x* (or *y*, or *r*) is larger that R_eff.

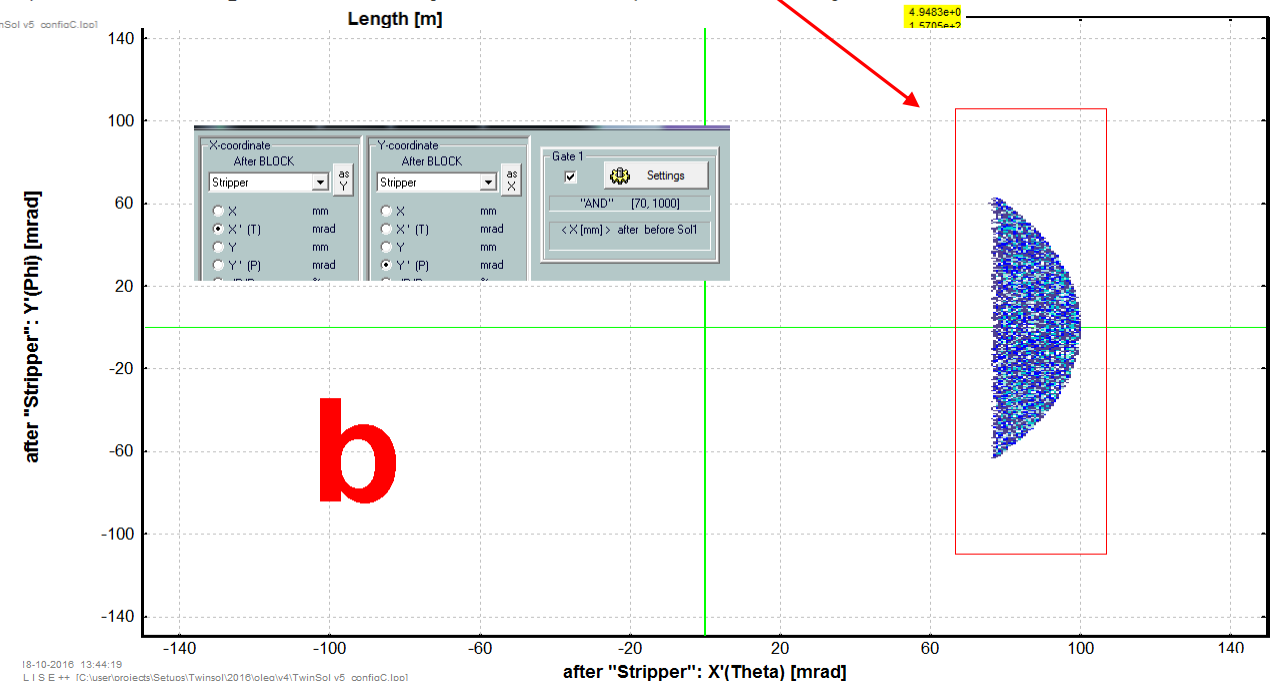
In reality this ray could not pass "TwinSol" : out of its apertures

Two peaks at Envelopes

LISE++ Monte Carlo engine using gates allows to find out, to understand some unexpected behavior



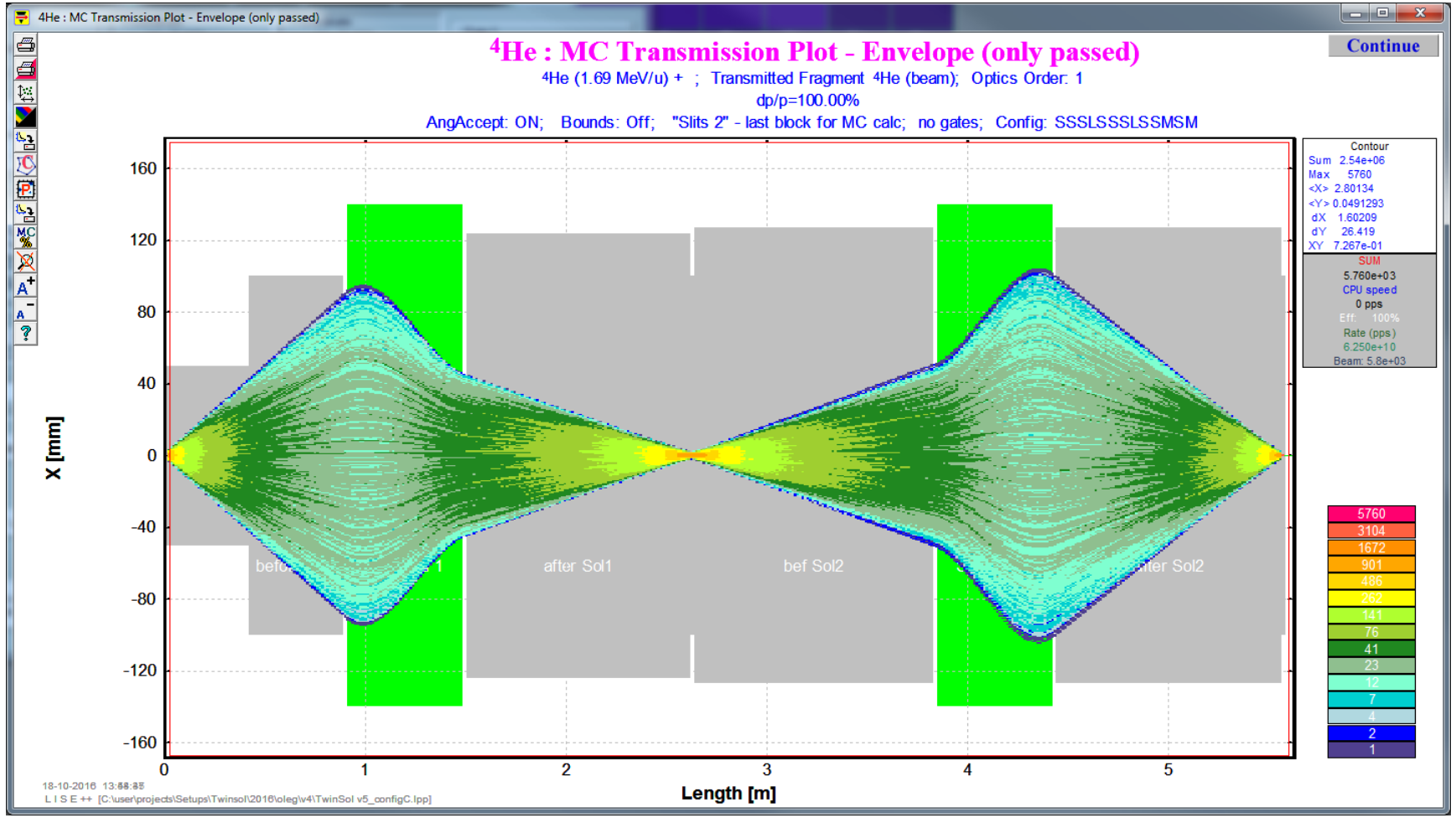




Two peaks at Envelopes vs angular emittance

Emittance [#1]

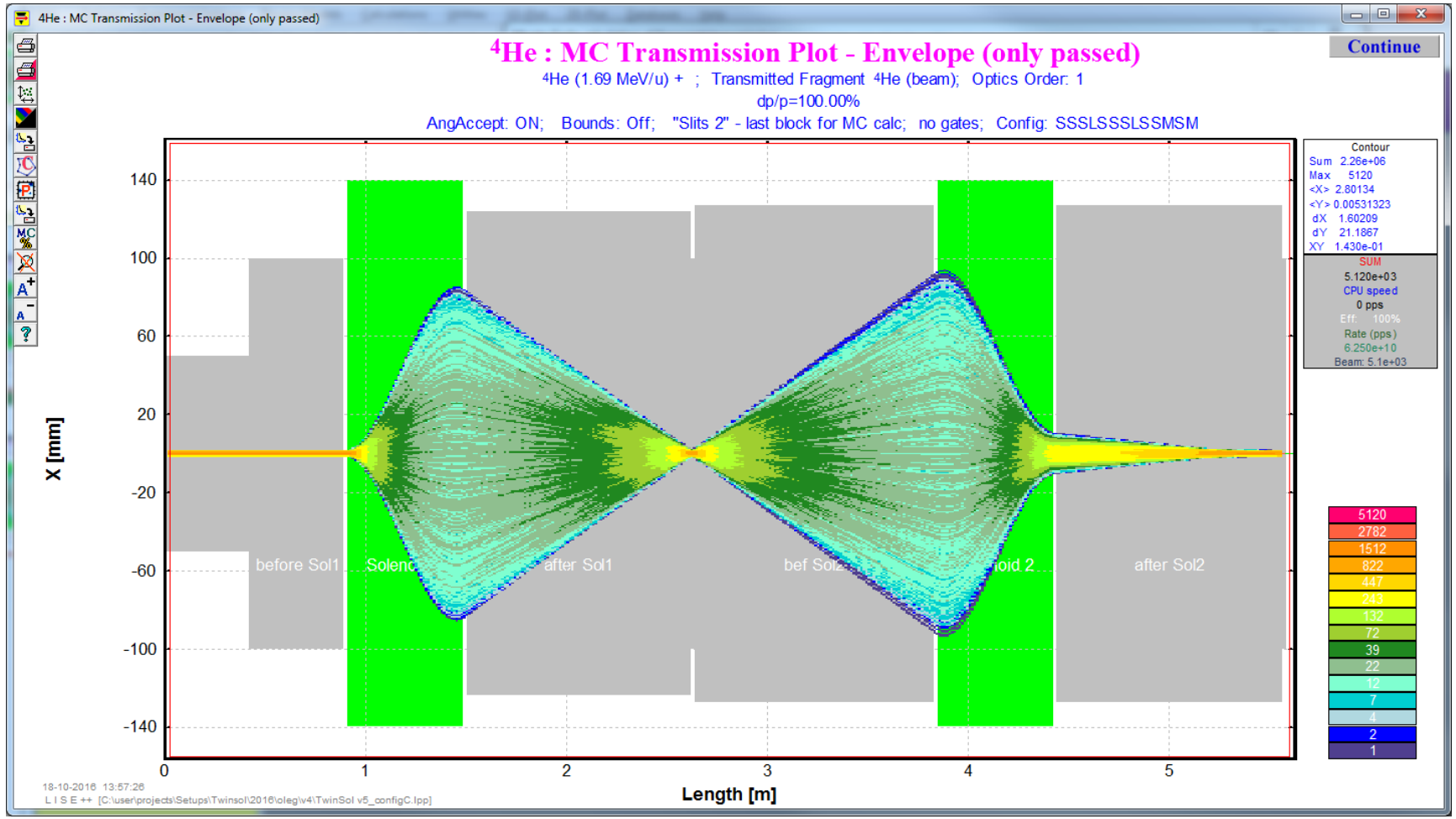
		Beam CARD (sigma, semi-axis, half-width...)	1D - shape (Distribution method)
1. X	mm	1.5	Ellipse uniform (proj.)
2. T	mrad	100	Ellipse uniform (proj.)
3. Y	mm	1.5	Ellipse uniform (proj.)
4. P	mrad	1	Ellipse uniform (proj.)
5. L	mm	0	Gaussian
6. D	%	0.0001	Gaussian



Two peaks at Envelopes vs angular emittance

Emittance [#1]

	Beam CARD (sigma, semi-axis, half-width...)		1D - shape (Distribution method)
1. X	mm	1.5	Ellipse uniform (proj.)
2. T	mrad	0	Ellipse uniform (proj.)
3. Y	mm	1.5	Ellipse uniform (proj.)
4. P	mrad	100	Ellipse uniform (proj.)
5. L	mm	0	Gaussian
6. D	%	0.0001	Gaussian



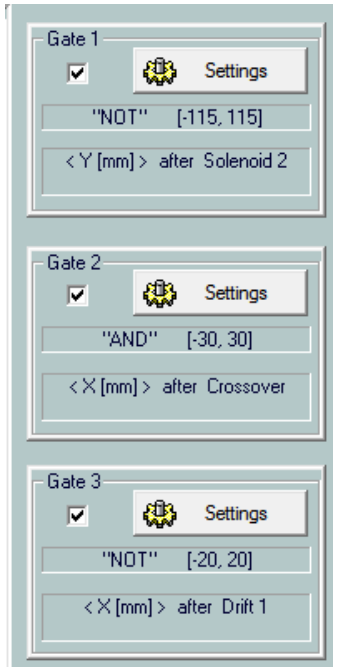
Previous presentation: LISE^{++} Monte Carlo plot with gates

Beam

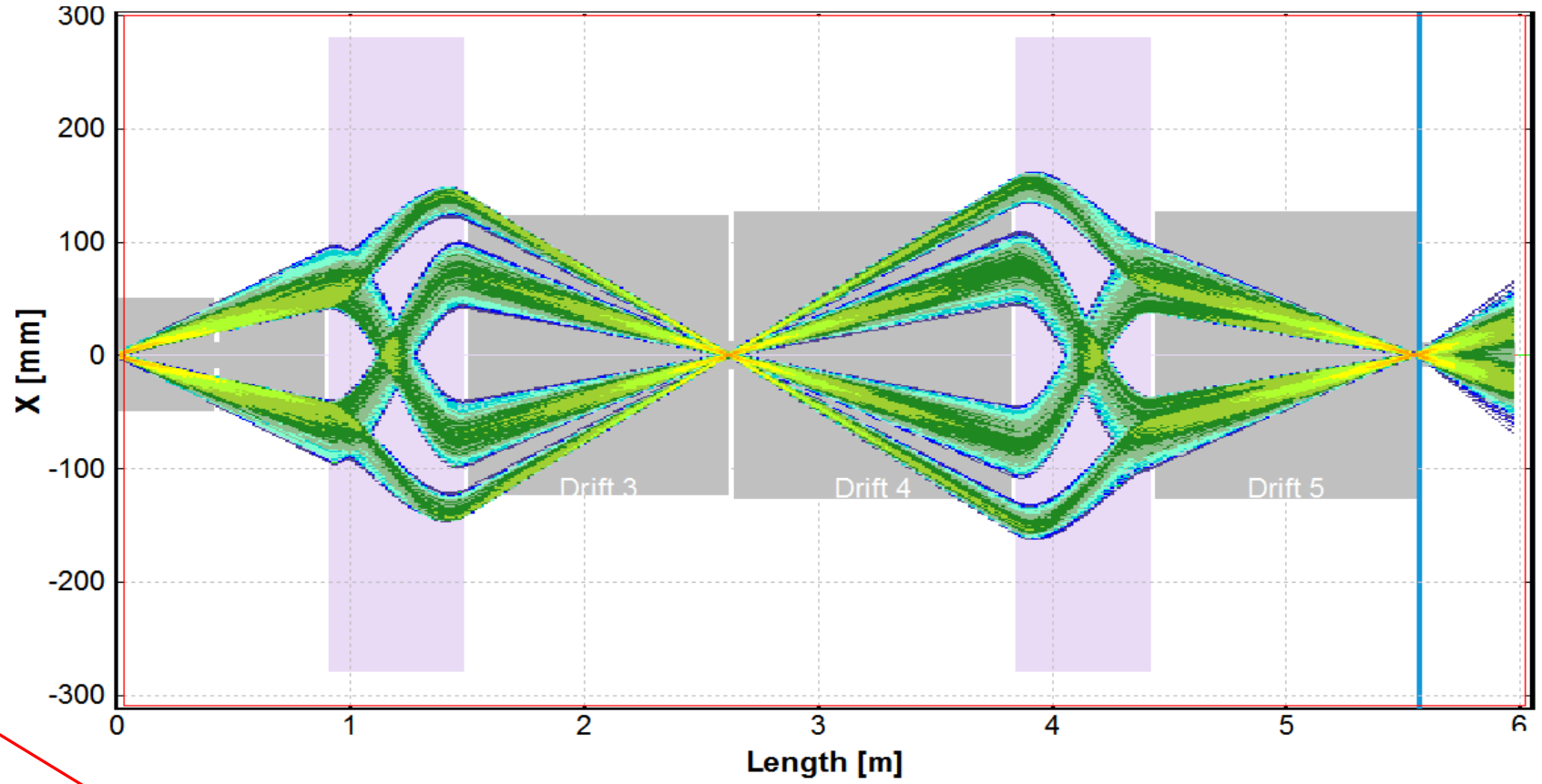
Emittance [#1]

	Beam CARD (sigma, semi-axis, half-width...)		1D - shape (Distribution method)	2D mode	2D - shape (Monte Carlo method)	Correlated with
1. X	mm	1.5	Ellipse uniform (proj.)	☑	Ellipse uniform	Y
2. T	mrad	150	Ellipse uniform (proj.)	☑	Ellipse uniform	P
3. Y	mm	1.5	Ellipse uniform (proj.)	☑	Ellipse uniform	X
4. P	mrad	150	Ellipse uniform (proj.)	☑	Ellipse uniform	T
5. L	mm	0	Gaussian	☐		
6. D	%	0.0001	Gaussian	☐		

MC gates



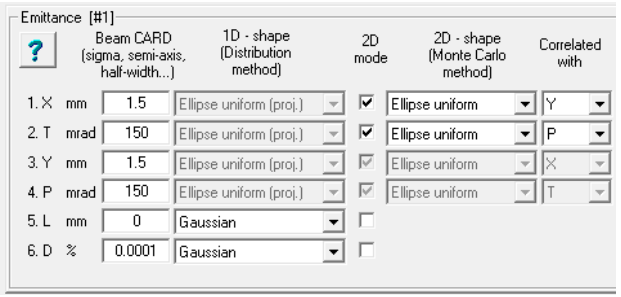
Do you remember this plot?



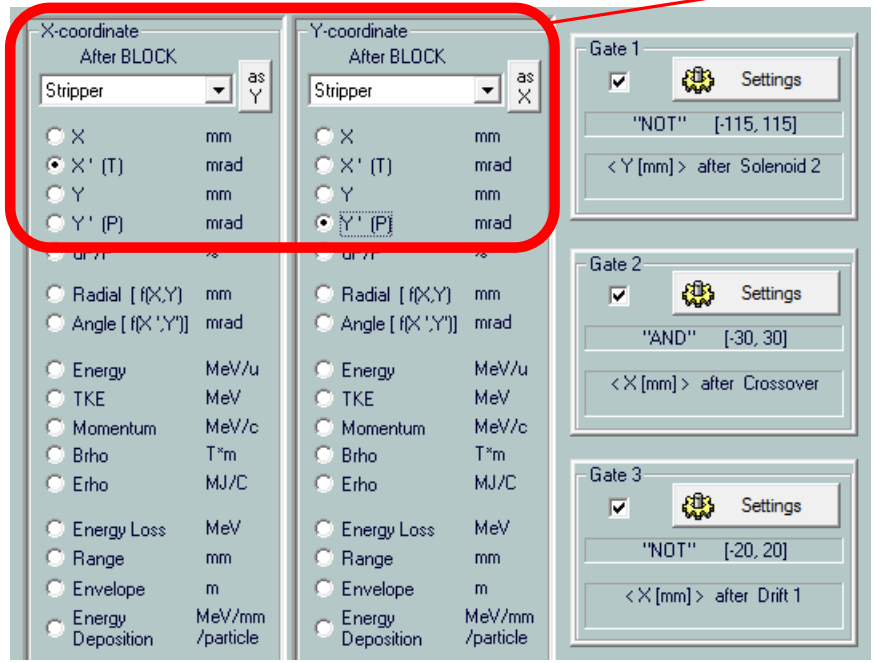
See on the next slide how
these gates work on initial X' & Y' distribution

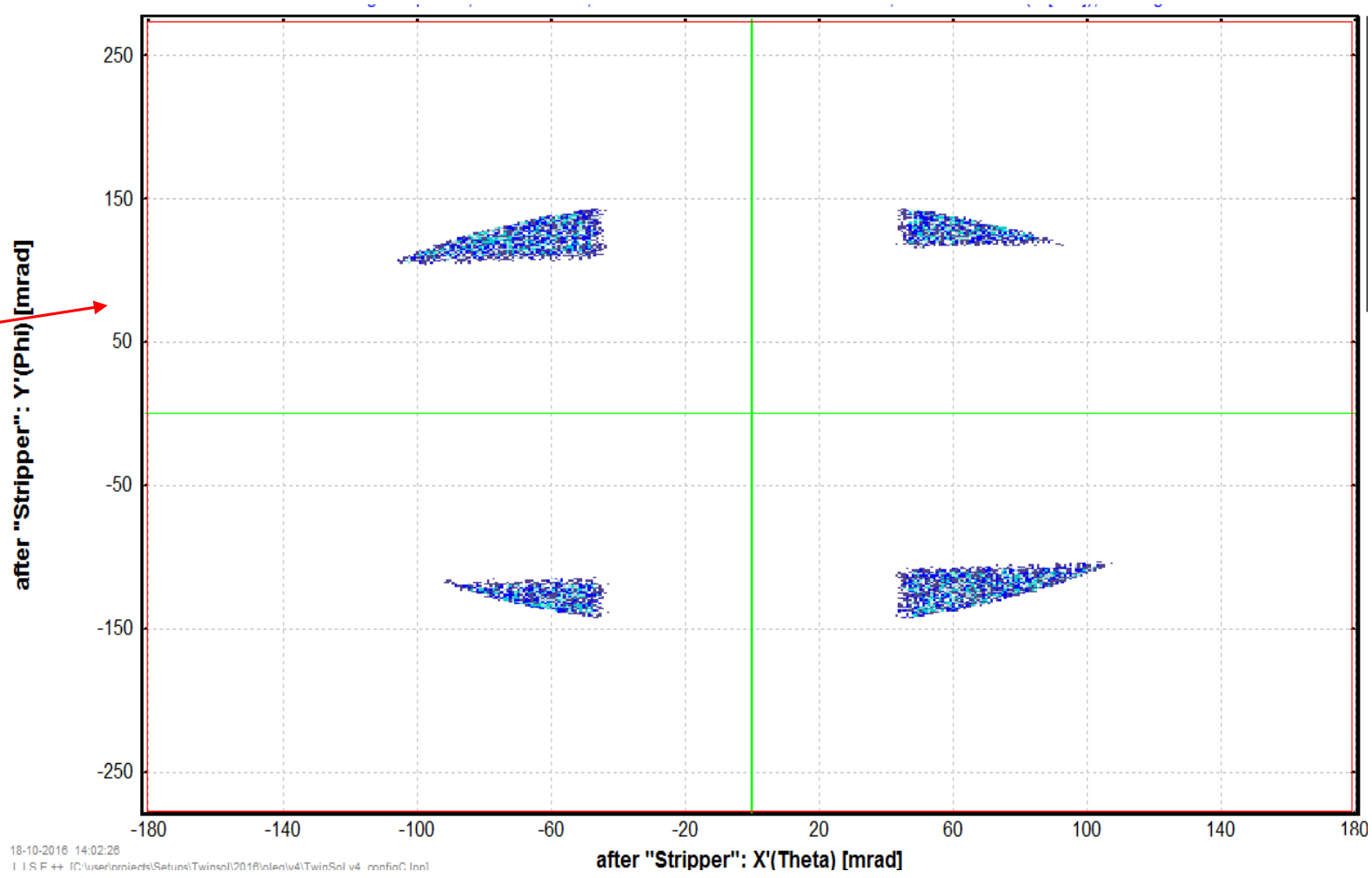
Previous presentation: LISE^{++} Monte Carlo plot with gates

Beam



MC dialog

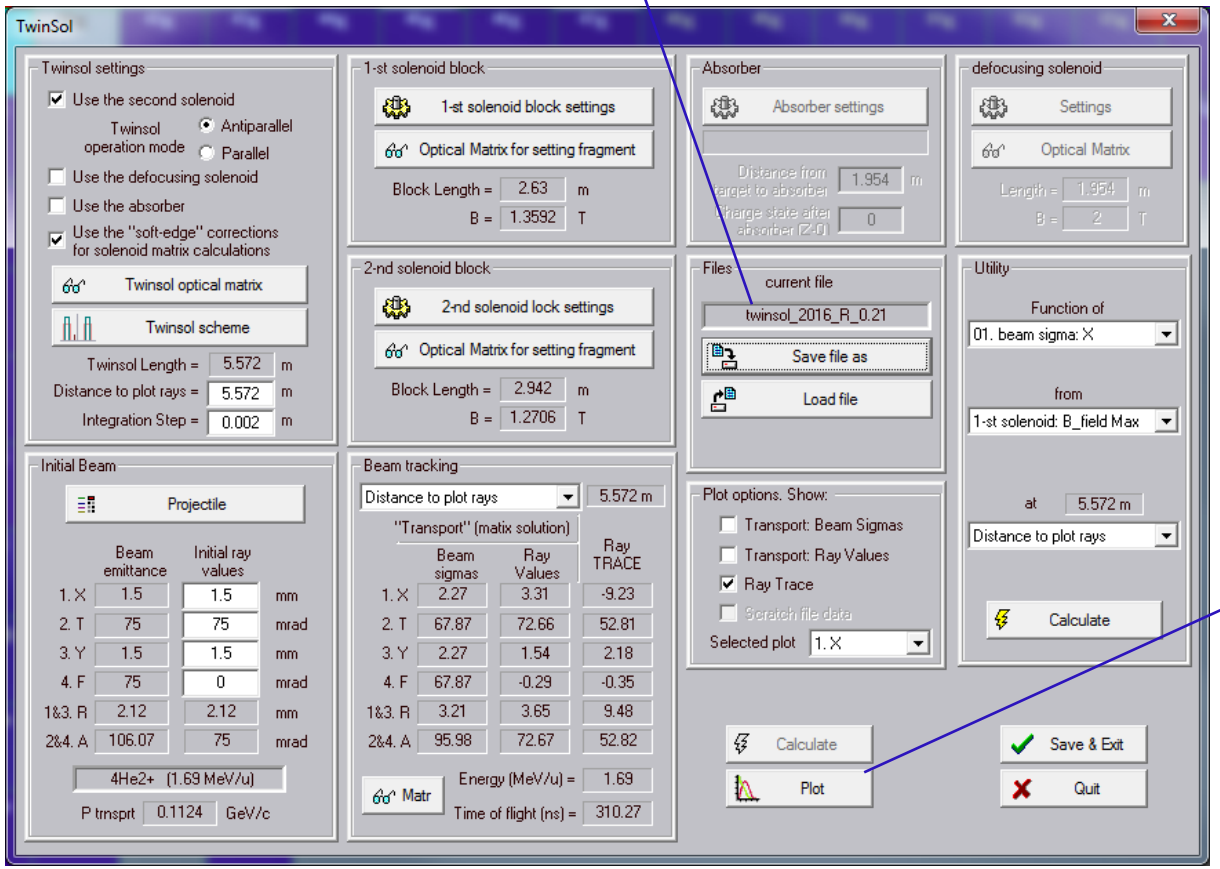


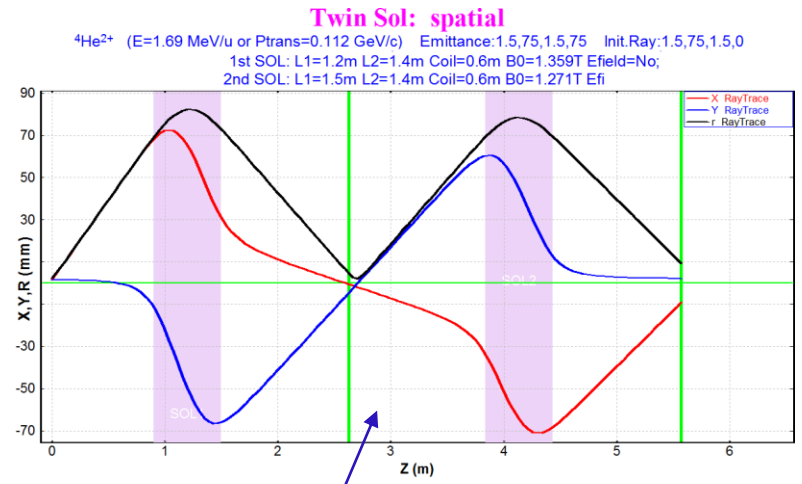


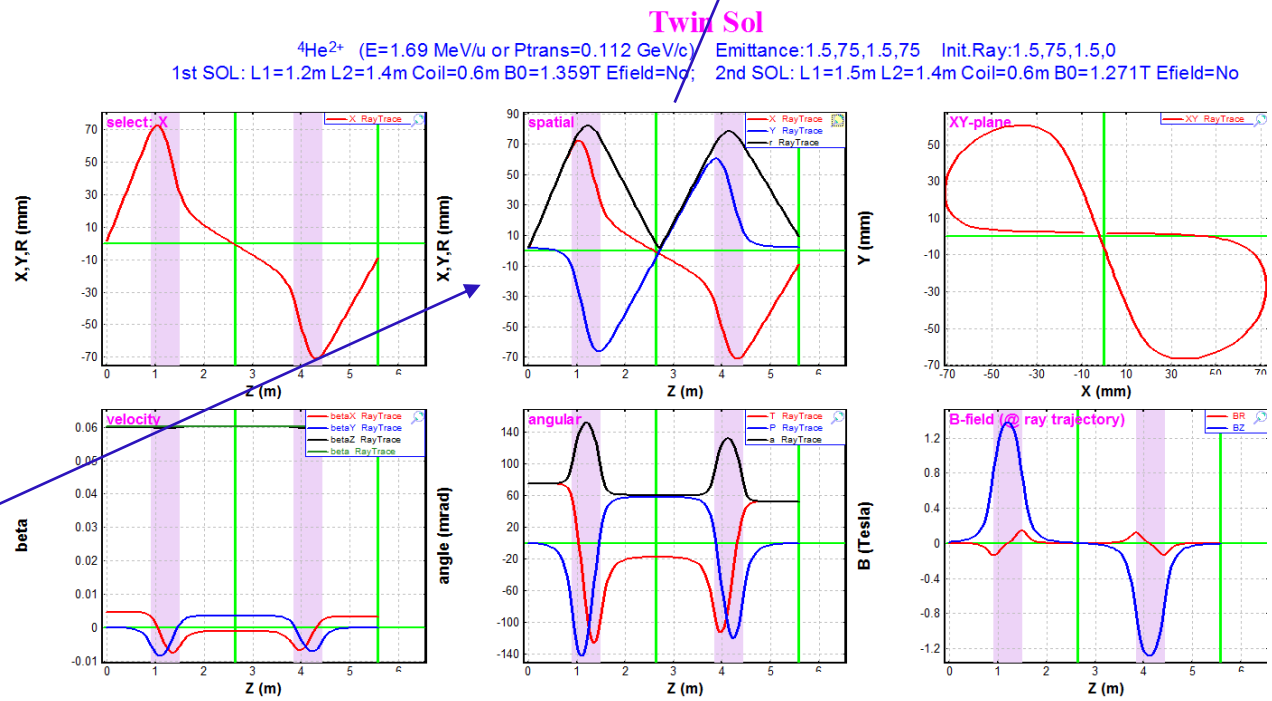
Are there two peaks with Twinsol the utility?

http://lise.nscl.msu.edu/9_10/twinsol_2016_R_0.21.twnsl

See the next page

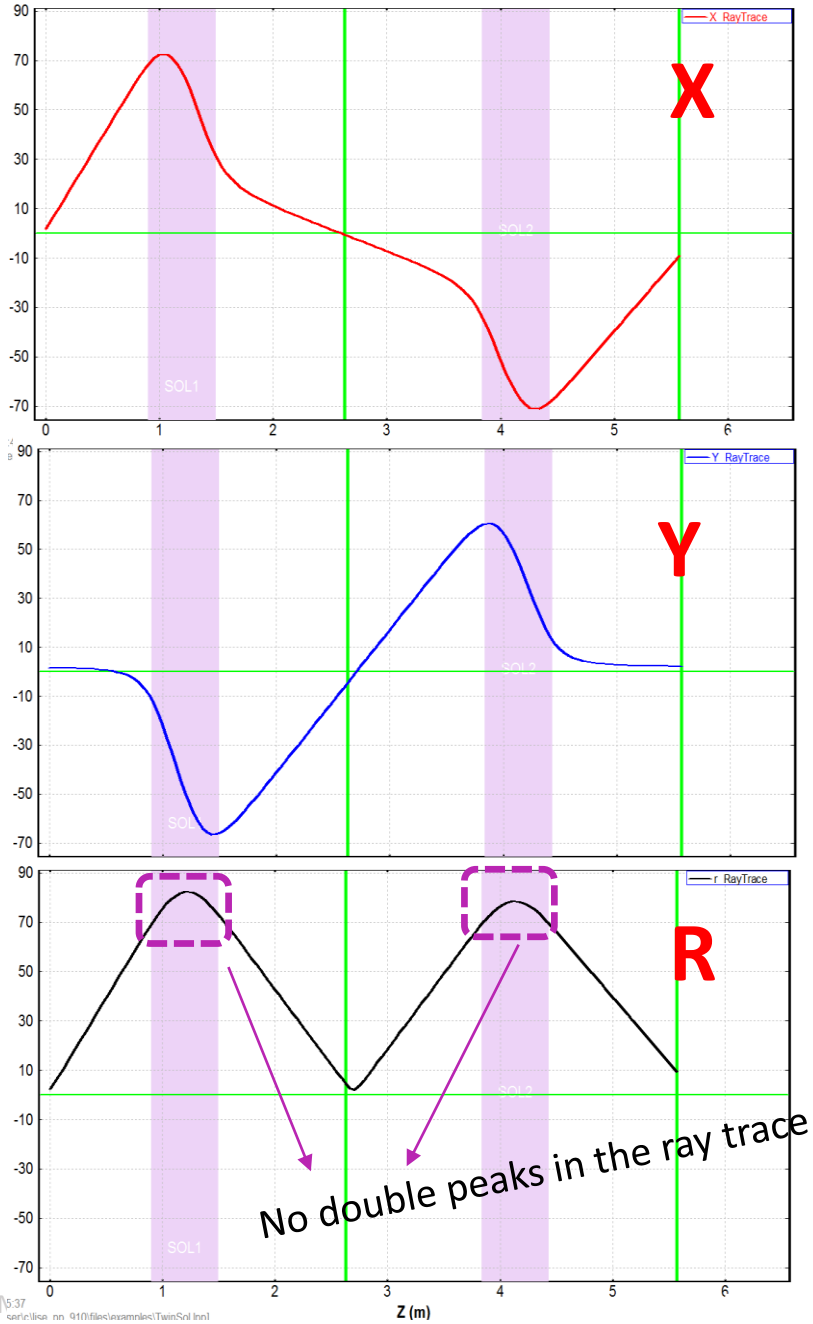






Are there two peaks with Twinsol the utility?

From the Twinsol utility



From the Monte Carlo transmission dialog