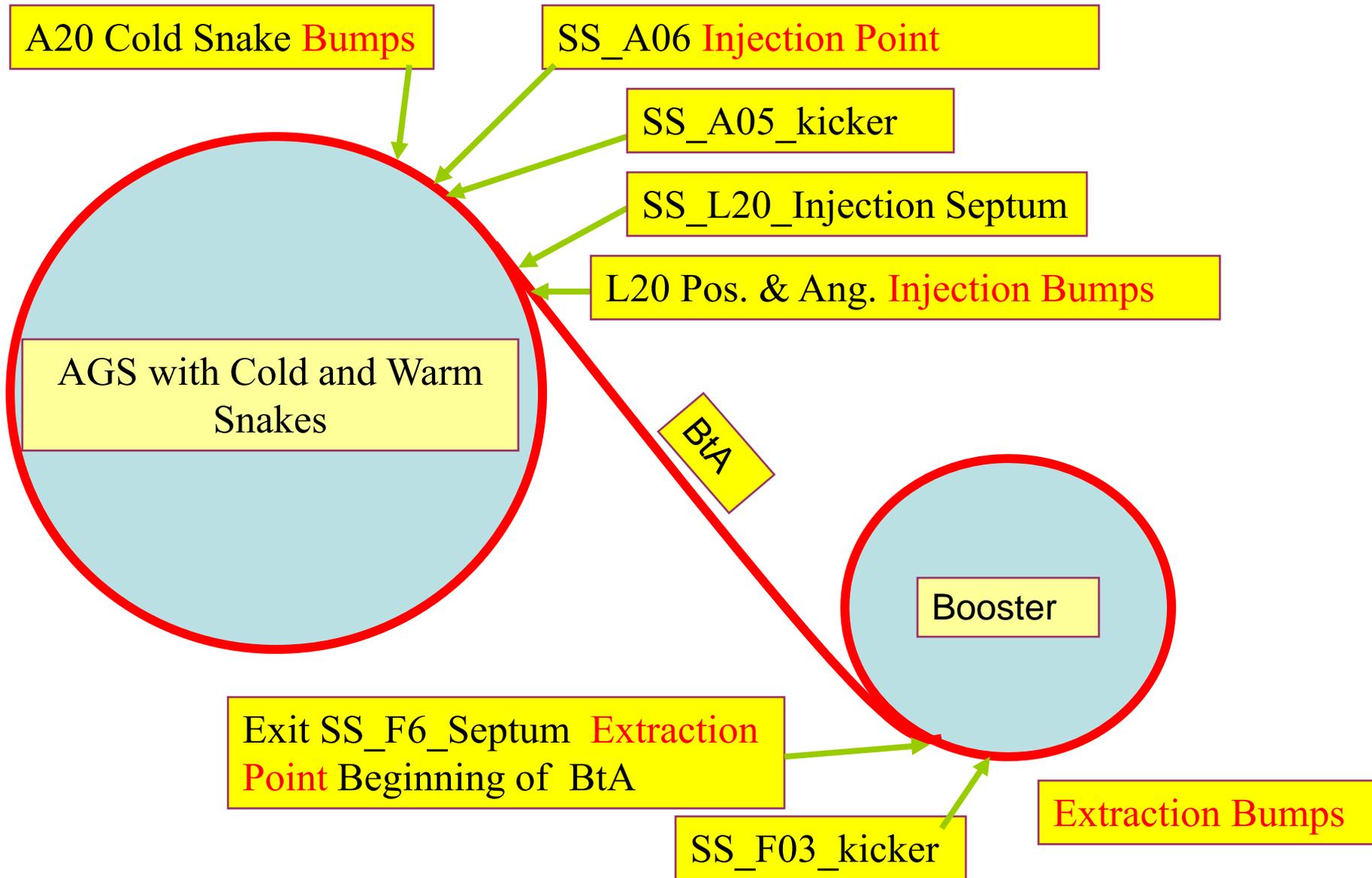


“Matching” BtA line to AGS with Cold and Warm Snakes

The proton polarization Group

Schematic diagram of Booster_BtA_AGS Complex



Conclusions

- The beam parameters of the “BtA injected beam into the AGS” can be matched to those of the circulating beam in AGS, at the injection point.
- With the addition of a solenoid in the BtA line; (W. MacKay). The Spin direction of the injected beam can also be almost co-linear to that of the circulating beam.
- Experimental confirmation of “matching” to be done

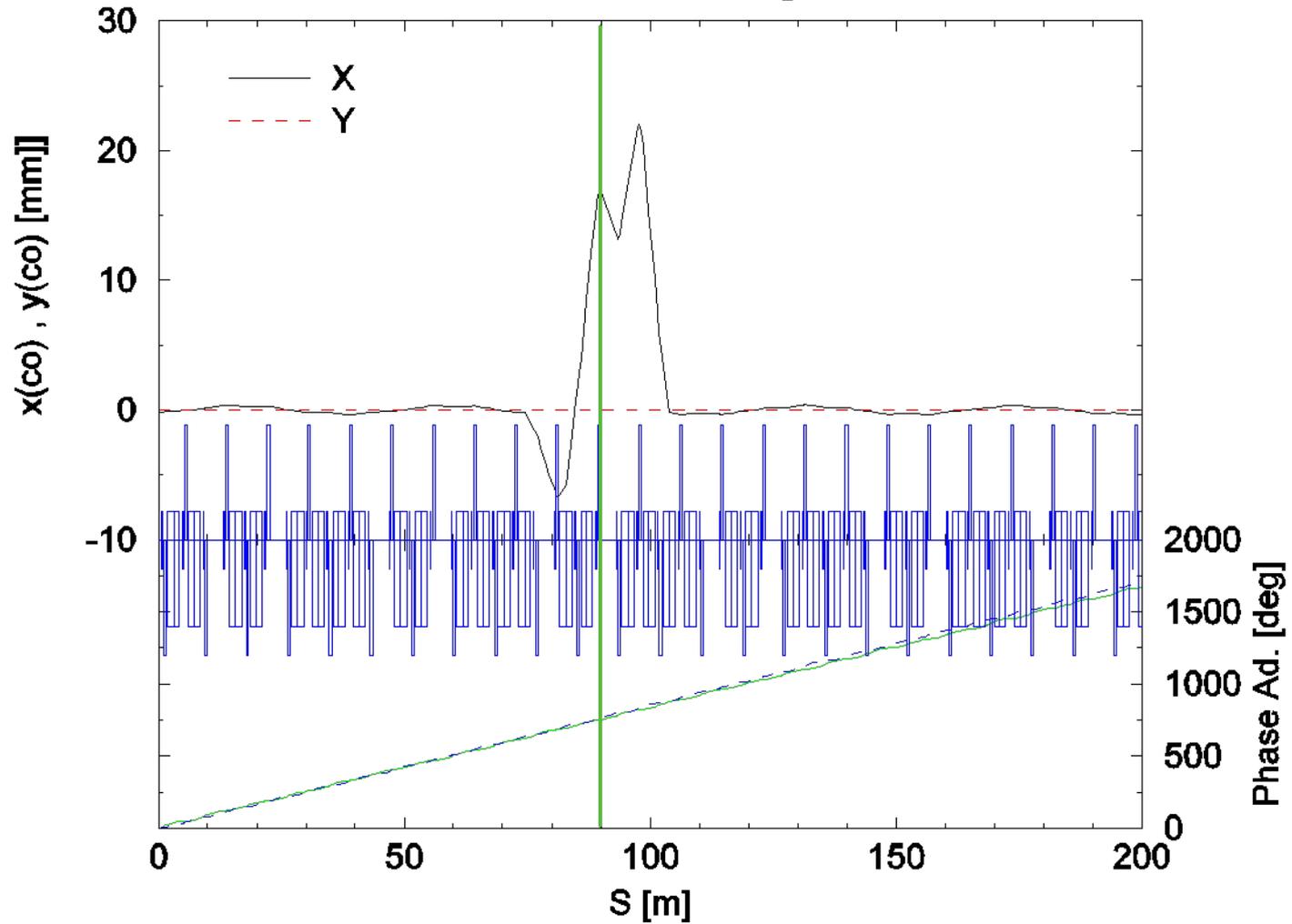
Calculations On:

- a) Beam Parameters at Booster extraction point.
- b) Beam Param. of Circ. Beam ($G\gamma=4.5$) at AGS Inj. Point
With AGS Csnk at 2.1 [T], Wsnk 5.9%, Comp. Quads.
- c) “Matching of BtA Line” to AGS at $G\gamma=4.5$
- d) Spin “Matching of BtA Line” to AGS at $Gg=4.5$

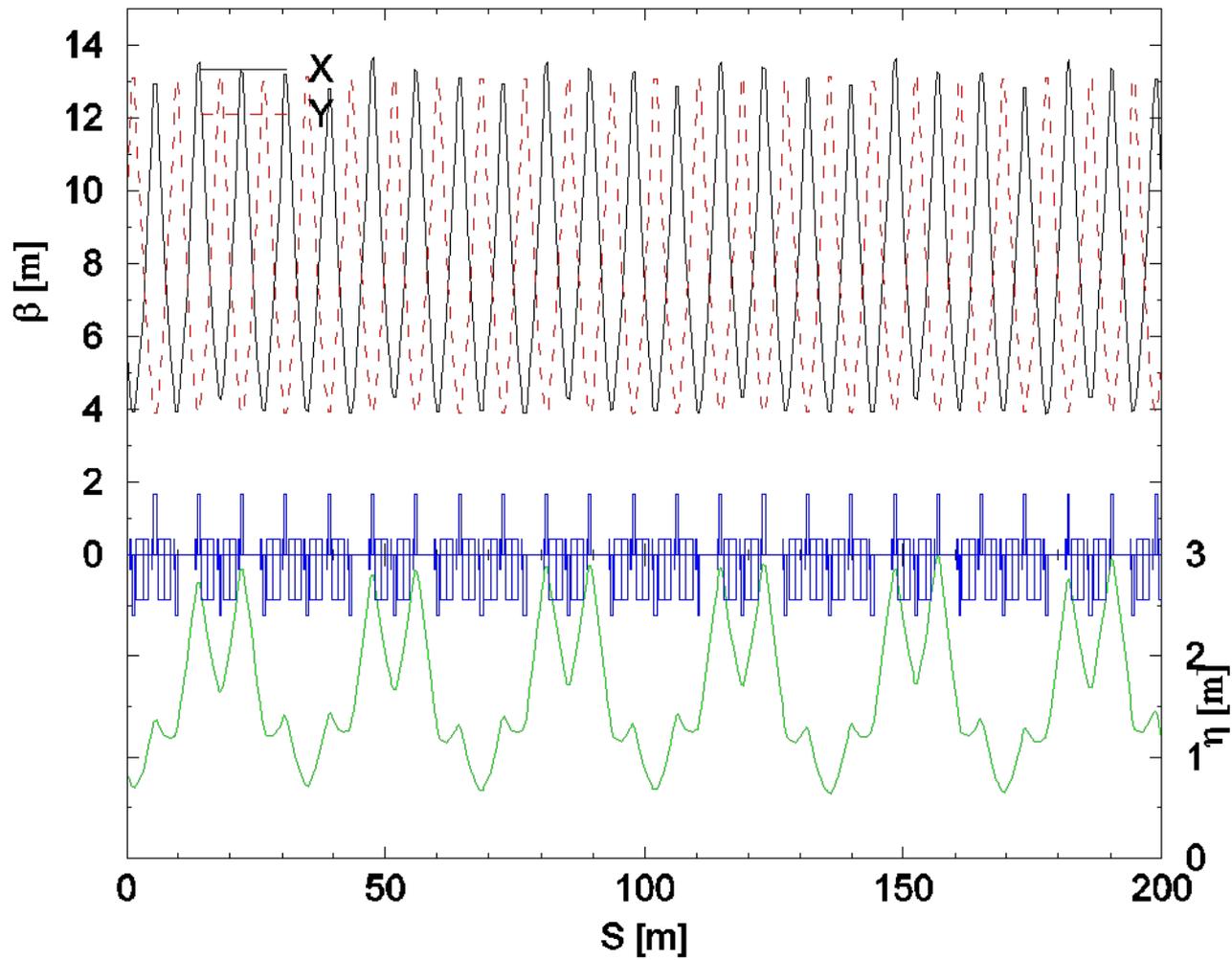
Beam parameters at the Booster extraction point
(next three slides)

Booster extraction closed orbit "4_bump"

Green line is F6 extr. Septum



$\beta_{x,y}$ functions at Booster Extraction



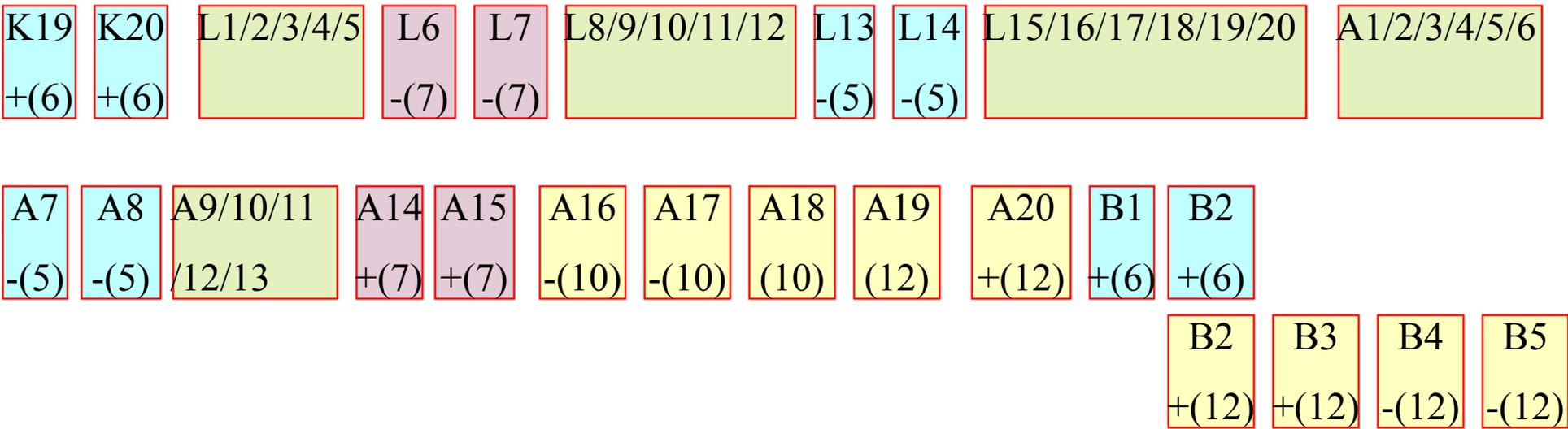
Time: Fri Jul 30 10:13:33 2004 Last file modify time: Fri Jul 30 09:24:00 2004

	Extraction setting		Beam parameters at Booster Extraction point					
	Q_x	Q_y	β_x [m]	α_x	η_x [m]	η'_x	β_y [m]	α_y
Set1	4.679	4.803	4.797	0.819	1.606	-0.415	10.890	-1.676
Set2	4.789	4.773	4.530	0.836	1.282	-0.561	10.982	-1.691

Booster Extraction point 15 cm from “exit iron” of F6 Septum

Beam parameters at the AGS Injection point (next six slides)

Arrangement of the Backleg Windings for the L20 (Position, Angle) and A20 (Csnk) Bumps



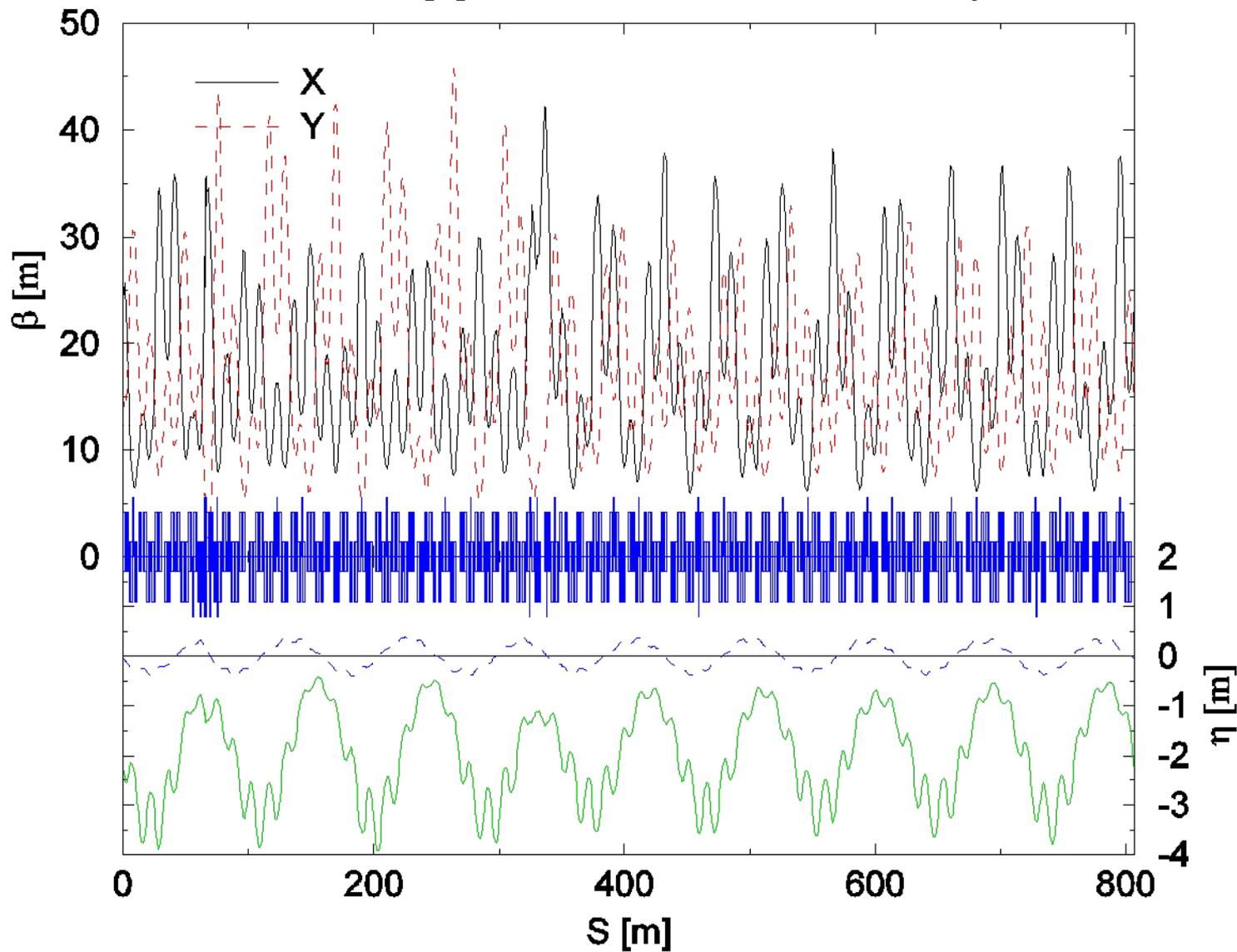
L20 Position

L20 Angle

A20 Cold Snake

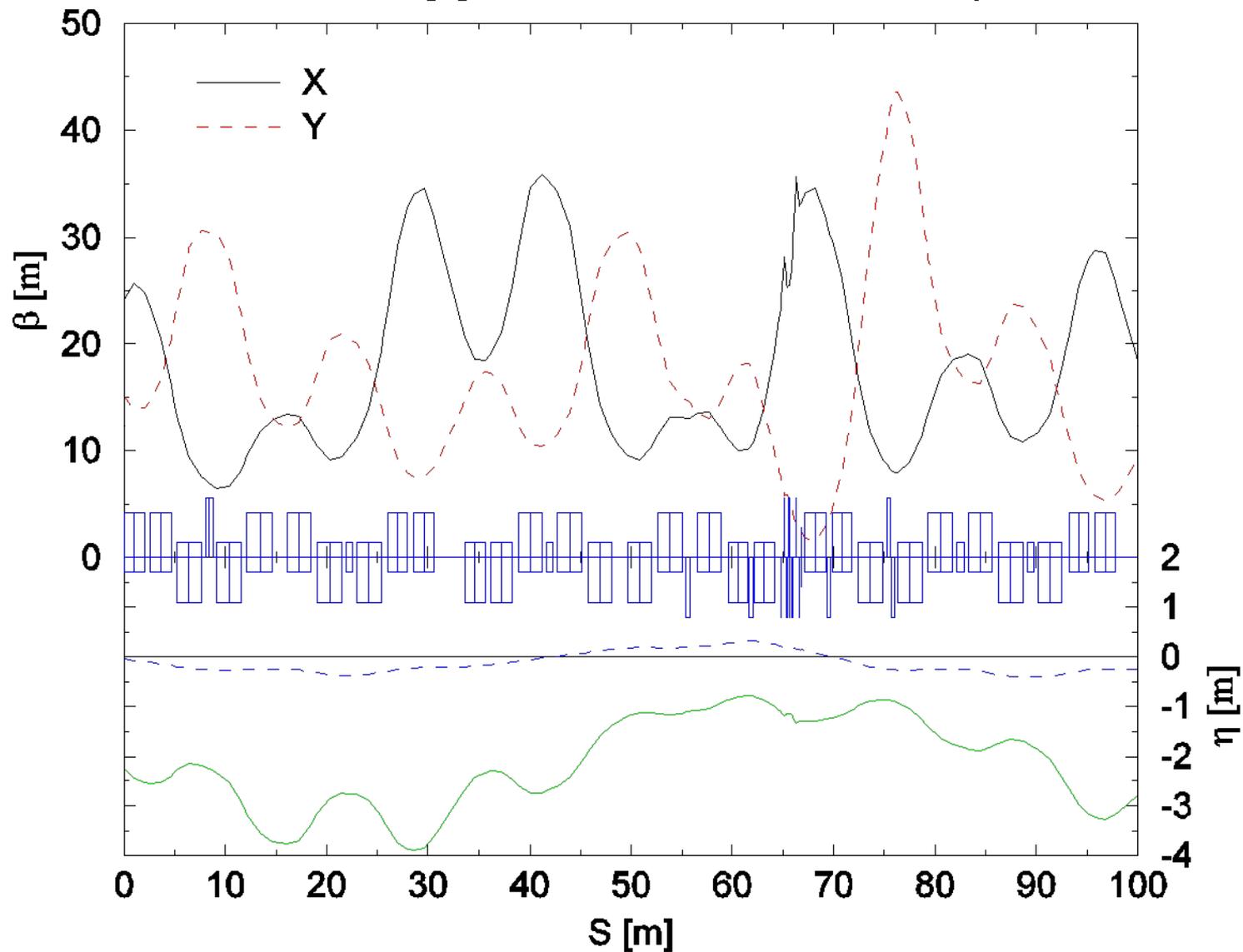
$\beta_{x,y}$ and $\eta_{x,y}$ vs. dist

AGS Csnk 2.1 [T] Wsnk 5.9% L20 and A20 Bumps ON



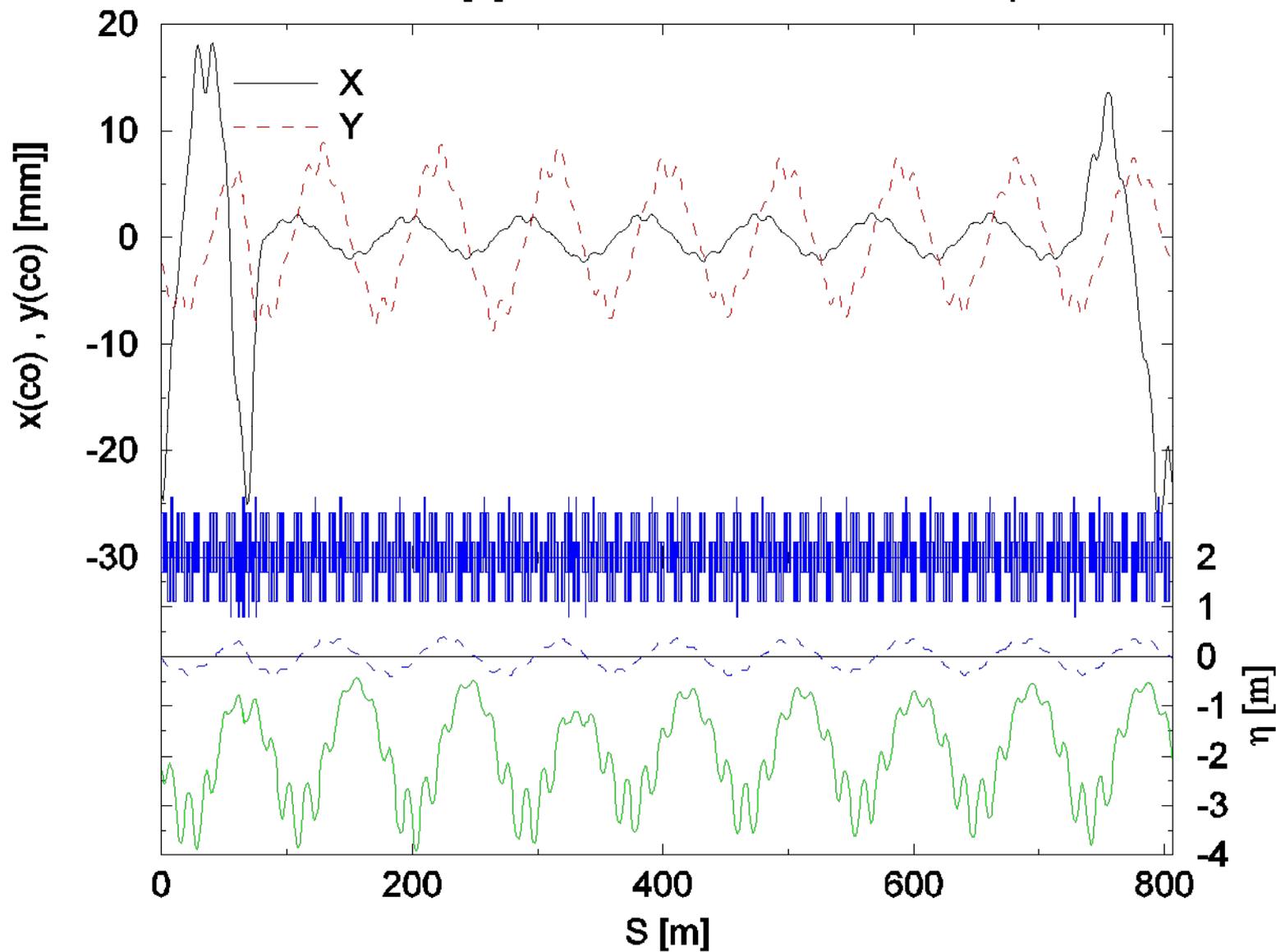
$\beta_{x,y}$ and $\eta_{x,y}$ vs. dist

AGS Csnk 2.1 [T] Wsnk 5.9% L20 and A20 Bumps ON



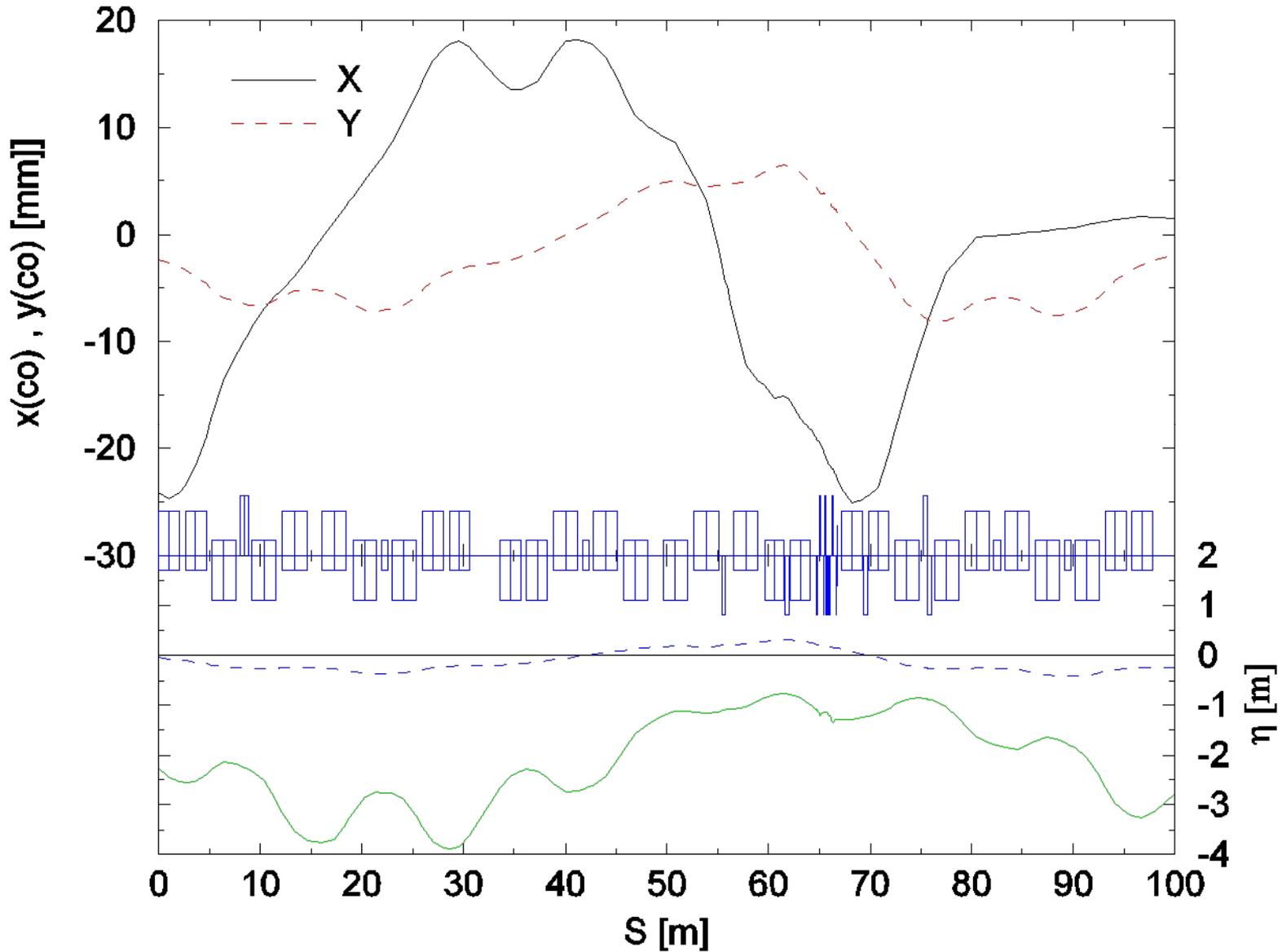
X_{cod} Y_{cod} and $\eta_{x,y}$ vs. dist

AGS Csnk 2.1 [T] Wsnk 5.9% L20 and A20 Bumps ON



X_{cod} Y_{cod} and $\eta_{x,y}$ vs. dist

AGS Csnk 2.1 [T] Wsnk 5.9% L20 and A20 Bumps ON



Beam Parameters at SS_A06 and SS_L20 of
AGS with Csnk 2.1 [T] and Wsnk 5.9%

	β_x	α_x	η_x	η'_x	β_y	α_y	x_{cod}	x'_{cod}
	[m]		[m]		[m]		[mm]	[mrad]
AGS_Circ SS_L20	19.593	-1.136	-1.894	-0.240	18.759	1.286	3.102	1.192
AGS_Circ SS_A06	10.919	0.956	-3.271	0.359	16.252	-1.665	-22.2	-1.22
AGS_Inj. SS_L20	20.970	-1.102	-1.903	-0.227	17.847	1.164	-80.23	162.88

Kick_of_L20_Septum = -166.9 [mrad] at $B\rho = 7.21$ [Tm]

Kick_of_A05_Kicker = -3.49 [mrad] Max_kick = 2.99 [mrad]

Matching BtA line to the AGS at Injection point
(next four slides)

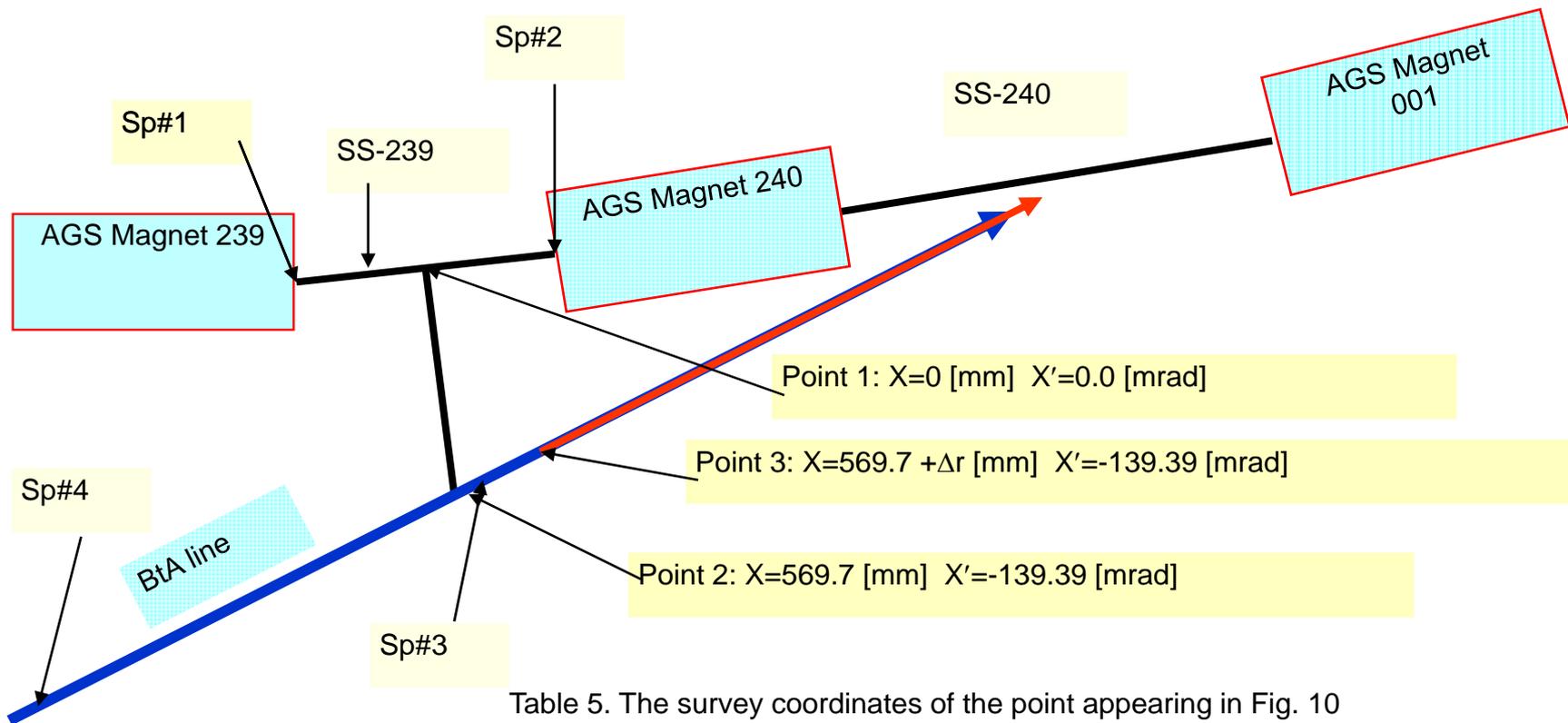
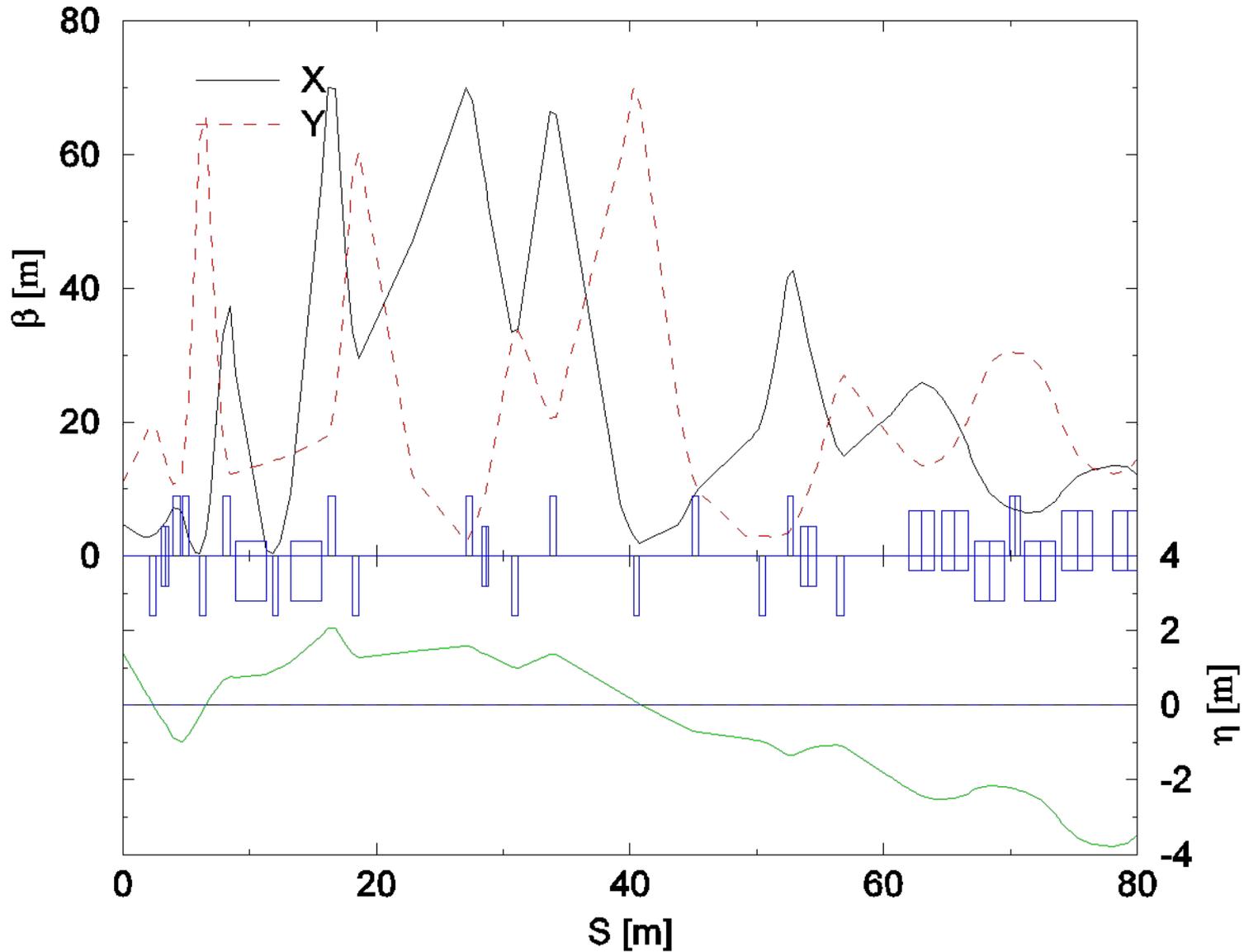


Table 5. The survey coordinates of the point appearing in Fig. 10

Survey point	North [inches]	East [inches]
Sp #1	13470.3532	2104.1939
Sp #2	13437.728	2094.6247
Sp #3	13458.813	2078.35623
Sp #4	13556.3479	2092.6908

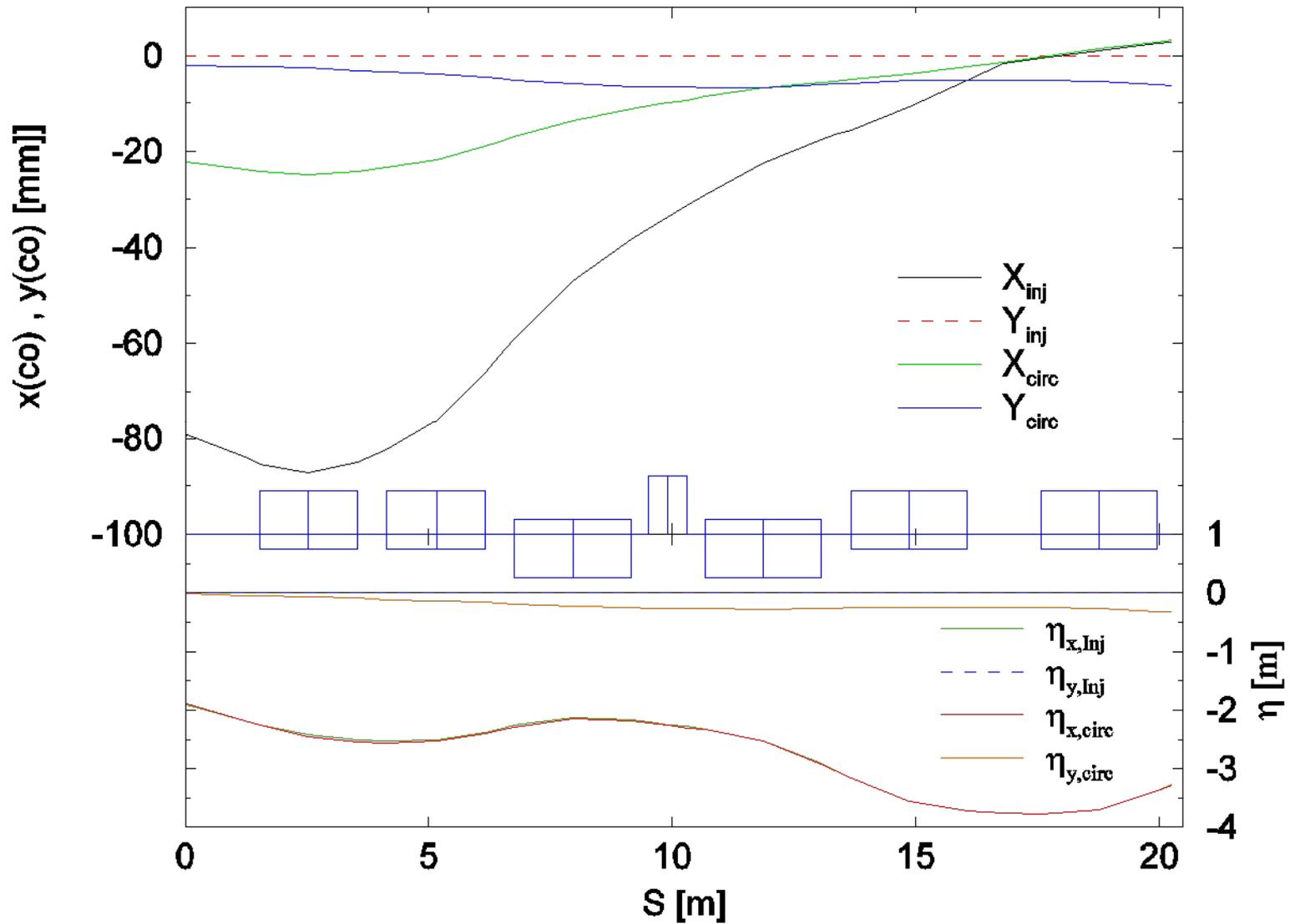
$\beta_{x,y}$ and $\eta_{x,y}$ vs Dist.

Exit of F20_Septum to middle of SS-A06



Xcod, Ycod, $\eta_{x,y}$ vs. Dist.

Circulation Injection from L20 to A06



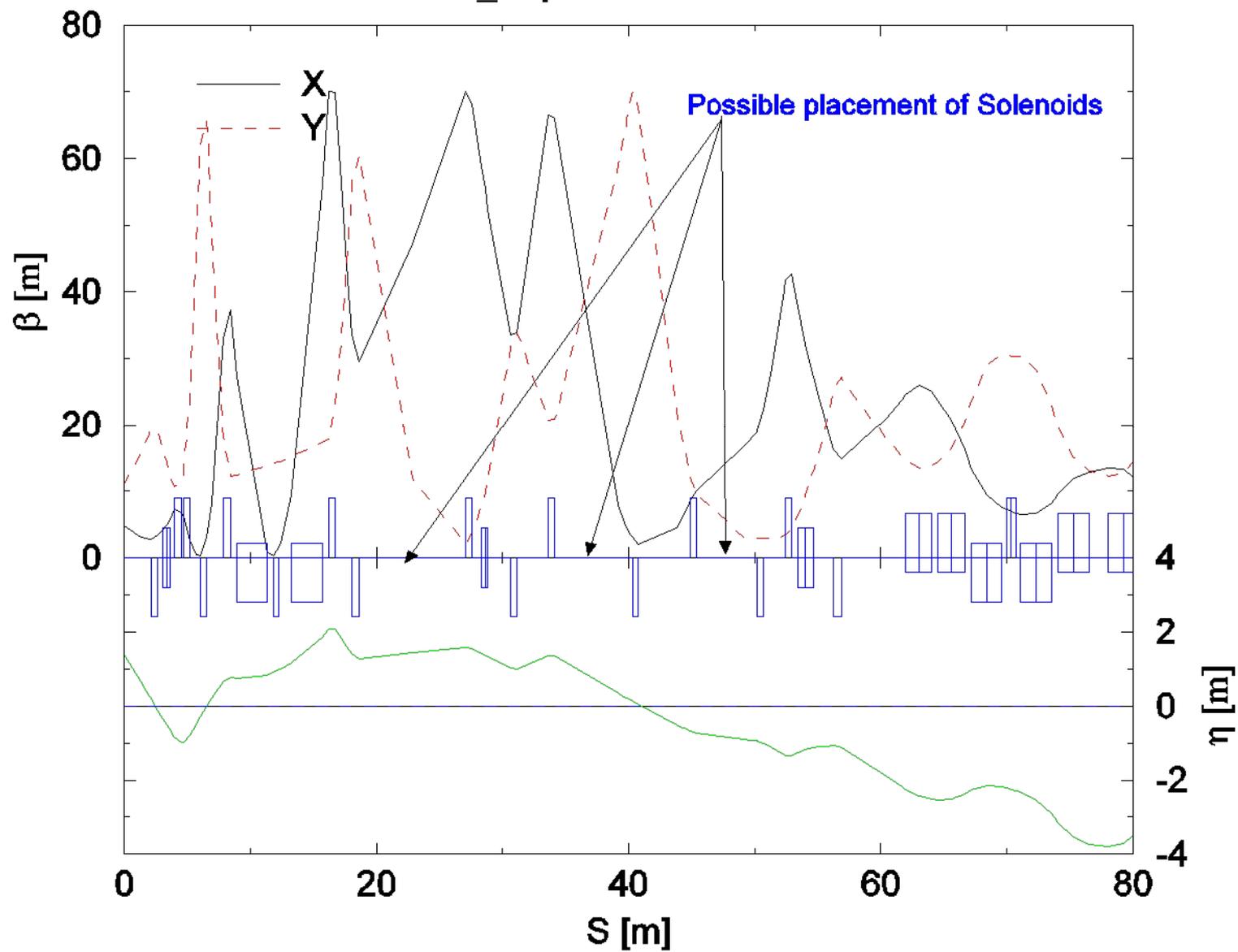
K1 values of BtA Quads in [A] $B\rho=7.205$ [T.m]

VALUE, IQ1	-5.529330E-01
VALUE, IQ2	1.112581E+00
VALUE, IQ3	-1.446875E+00
VALUE, IQ4	1.417047E+00
VALUE, IQ5	-9.669277E-11
VALUE, IQ6	8.527882E-01
VALUE, IQ7	-7.806083E-01
VALUE, IQ8	2.792502E-01
VALUE, IQ9	-6.053158E-01
VALUE, IQ10	4.914513E-01
VALUE, IQ11	-4.295718E-01
VALUE, IQ12	3.845717E-01
VALUE, IQ13	-3.273570E-01
VALUE, IQ14	5.499925E-01
VALUE, IQ15	4.021250E-01

“Spin Matching” BtA line to AGS with
Cold and Warm Snakes
(next two slides

$\beta_{x,y}$ and $\eta_{x,y}$ vs Dist.

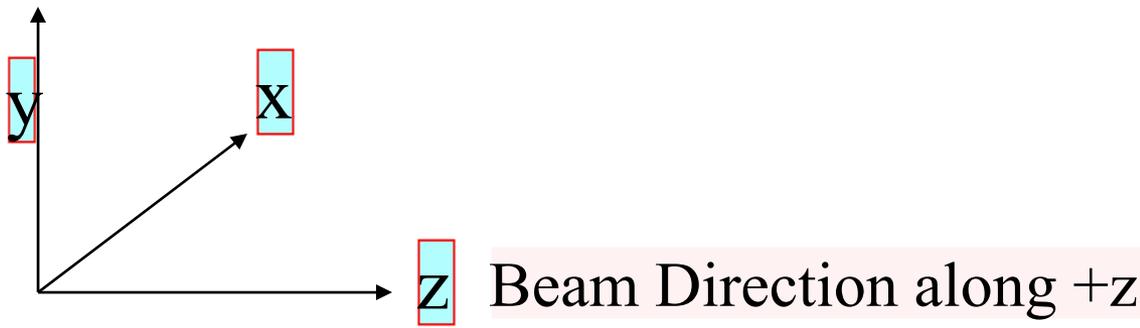
Exit of F20_Septum to middle of SS-A06



Stable Spin Direction at SS_L20 (At Polarm?)

AGS with Cold 2.1 [T] Worm Snake 5.9%

	S_x	S_y	S_z
AGS_CircSS_L20	0.10824	0.98821	0.10824
BtA_at_SS_L20	0.1500	0.98824	0.0296
Solenoid Dwsrtm QV7	(0.066)	(0.980)	(0.185)
Set at 1.33 kGauss	Oscillate	Oscillate	Oscillate
BtA_at_SS_L20	0.000	1.0000	0.000
Solenoid Dwsrtm QV7	(0.215)	(0.953)	(0.213)
Set at 0.00 kGauss	Oscillate	Oscillate	Oscillate



The End