

Implementation of 750 MeV lattice for N/S Damping Ring complex

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Issues

- LTR/RTL dipoles: relative saturation, shunts, boosts
- DR septa: B1/B2 shunts
- permanent magnet quadrupoles in LTR/RTL: matching (OK)
- LTR/RTL QTRMs: matching (LOOKS OK ...)
- DR permanent magnet sextupoles (NOT DISCUSSED)

	NDR		SDR	
	ξ_x	ξ_y	ξ_x	ξ_y
1.19 GeV	0.2403	0.0907	0.2131	0.2959
750 MeV	1.1443	1.4784	1.1278	1.6918

SLTR Bend @ 750 MeV

B(LGPS)= 0.75529 GeV

I(LGPS) = 209.3 amp (385.9 @ 1.19 GeV)

Device	I (desired)	ΔI (main)	I (trim)	strength	trim powered by	I _{max} (trim)	$\Delta\theta$ (mrad)
B291	205.2	-4.0	-2.4	2.963	XCOR DR01 291	12.0	
B321	205.8	-3.5	-2.0	2.986	XCOR DR01 321	12.0	
B511	209.3	0.0	0.0	2.705	not powered		
B531	209.3	0.0			no trim		
B551	209.3	0.0	0.0	2.705	not powered		
B571	209.3	0.0	0.0	2.705	not powered		
B591	209.3	0.0			no trim		
B621	195.9	-13.4	-7.8	4.049	XCOR DR01 621	8.0	
B641	209.3	0.0			no trim		
B661	209.3	0.0	0.0	2.705	not powered		
B681	195.9	-13.4	-7.8	4.049	XCOR DR01 681	8.0	
B711	195.9	-13.4	-7.8	4.049	XCOR DR01 711	12.0	
B731	209.3	0.0			no trim		
B751	209.3	0.0	0.0	2.705	not powered		
B771	209.3	0.0			no trim		
B791	209.3	0.0	0.0	2.705	not powered		
B951	219.3	10.0	5.9	1.898	XCOR DR01 951	12.0	
B961	218.5	9.3	5.4	1.904	XCOR DR01 961	12.0	
B1221	222.1	12.9	9.4	2.082	XCOR DR01 1221	12.0	
B1231	209.4	0.1			no trim		
B1251	209.4	0.1	0.1	2.713	XCOR DR01 1251	12.0	
B1271	209.4	0.1			no trim		
B1281	221.6	12.3	9.0	2.170	XCOR DR01 1281	12.0	

NOTE: • PRESENT XCOR/YCOR SETTINGS NOT INCLUDED IN CALCULATION OF

750 MeV SETPOINTS

- WIMPIEST LTR/STR COLLECTORS (LITTLE BLUE "SCOR"r) HAVE ± 2.5 MRAD RANGE @ 750 MeV ... RESIDUAL $\Delta\theta$'s < 0.5 mrad IGNORED

SLTR Vertical Bend @ 750 MeV

B(LGPS)= 0.75359GeV

I(LGPS) = 172.8 amp (276.5 @ 1.19 GeV)

Device	I (desired)	ΔI (main)	I (trim)	strength	trim powered by	I _{max} (trim)	$\Delta\theta$ (mrad)
VB121	172.8	0.0	0.0	1.035	not powered		
VB371	173.5	0.7	0.4	1.031	YC0R DR01 371	12.0	
VB451	172.5	-0.3	-0.2	1.060	YC0R DR01 451	12.0	

NLTR Bend @ 750 MeV

B(LGPS) = 0.73750 GeV

I(LGPS) = 203.9 amp (370.4 @ 1.19 GeV)

Device	I (desired)	ΔI (main)	I (trim)	strength	trim powered by	I _{max} (trim)	$\Delta\theta$ (mrad)
VB120	233.2	29.2	3.4	0.998	YCOR DR11 120	12.0	
B280	195.9	-8.1			no trim		6.314
B290	197.6	-6.3			no trim		4.847
VB370	232.3	28.4	17.0	1.018	YCOR DR11 370	12.0	-1.027
VB450	232.3	28.3	17.0	1.019	not powered		3.523
B510	204.2	0.3			no trim		
B530	203.8	-0.2			no trim		
B550	203.8	-0.1			no trim		
B570	203.4	-0.6			no trim		
B590	203.9	0.0	0.0	2.402	XCOR DR11 590	12.0	
B620	204.0	0.1			no trim		
B640	203.7	-0.2			no trim		
B660	204.0	0.1			no trim		
B680	204.0	0.1	0.0	2.424	not powered		
B710	204.0	0.0			no trim		
B730	204.1	0.1			no trim		
B750	204.0	0.0			no trim		
B770	204.0	0.0	0.0	2.432	XCOR DR11 770	12.0	
B790	204.3	0.3			no trim		
B950	211.7	7.7			no trim		-3.788
B960	211.8	7.8			no trim		-3.830
B1210	205.4	1.4			no trim		1.042
B1230	204.5	0.5			no trim		
B1250	202.5	-1.4			no trim		-1.047
B1270	204.0	0.1			no trim		
B1290	204.9	1.0			no trim		0.704

N/S RTL Bend @ 750 MeV

Notes:

SPLIT BEAMS WERE NOT MEASURED
BELOW 240 AMPS ... LINEAR SLOPE
FROM 0-240 AMPS USED

B(LGPS)= 0.75315GeV

I(LGPS) = 194.8 amp (314.4 @ 1.14 GeV)

Device	I (desired)	ΔI (main)	I (trim)	strength	trim powered by	I _{max} (trim)	$\Delta\theta$ (mrad)
B190N	195.6	0.8	0.5	1.240	series w/200		
B200N	195.6	0.8	0.5	1.234	XCOR DR13 200	6.2	
B250N	194.7	-0.1	-0.1	1.266	XCOR DR13 250	12.0	
B300N	194.9	0.1	0.1	1.267	series w/310		
B310N	195.0	0.2	0.1	1.262	XCOR DR13 310	12.0	
B370N	194.7	-0.1	-0.1	1.269	series w/380		
B380N	194.6	-0.2	-0.1	1.267	XCOR DR13 380	12.0	
B420N	194.9	0.1	0.1	1.265	series w/430		
B430N	194.7	-0.1	-0.1	1.268	XCOR DR13 430	12.0	
B480N	194.9	0.1	0.1	1.264	XCOR DR13 480	12.0	
B510N	196.7	1.9	1.1	1.174	not powered		1.009
B640N	174.8	-20.0	-11.2	2.092	XCOR DR13 640	12.0	
B680N	195.3	0.5	0.3	1.240	XCOR DR13 680	12.0	
B690N	195.6	0.7	0.4	1.236	XCOR DR13 690	12.0	
B790N	196.7	1.9	1.1	1.179	XCOR DR13 790	12.0	
HB0	174.0	-20.8	-11.7	2.028	LGPS DR13 8	-9.0	2.939
B191S	195.7	0.9	0.5	1.235	XCOR DR03 191	12.0	
B201S	196.1	1.2	0.7	1.240	series w/191		
B251S	195.2	0.4	0.3	1.277	XCOR DR03 251	12.0	
B301S	195.0	0.2	0.1	1.267	not powered		
B311S	194.6	-0.2	-0.1	1.290	not powered		
B371S	194.6	-0.2	-0.1	1.295	series w/381		
B381S	194.6	-0.2	-0.1	1.296	XCOR DR03 381	12.0	
B421S	194.9	0.1	0.1	1.275	not powered		
B431S	194.7	-0.1	-0.1	1.286	not powered		
B481S	195.0	0.2	0.1	1.269	not powered		
VB491S	167.2	-27.6	-15.9	1.853	YCOP DR03 491	8.4	3.646
B511S	197.3	2.5	1.5	1.164	XCOR DR03 511	12.0	
VB571S	197.7	2.9	1.5	1.197	YCOP DR03 571	12.0	
B641S	179.7	-15.1	-8.5	2.094	XCOR DR03 641	6.2	-2.535
B681S	195.7	0.9	0.5	1.246	XCOR DR03 681	12.0	
B711S	196.0	1.2	0.7	1.244	series w/681		
VB791S	167.9	-26.9	-15.6	1.839	YCOP DR03 791	12.0	1.741
B811S	197.7	2.9	1.8	1.178	XCOR DR03 811	12.0	
VB871S	200.5	5.7	3.5	1.009	YCOP DR03 871	12.0	

NDR Injection Septum and NLTR B1 @ 750 MeV

I(LGPS) = 1608.5 amp (2570.0 @ 1.19 GeV)

Device	I (desired)	ΔI (main)	I (trim)	strength	trim powered by	I _{max} (trim)	$\Delta\theta$ (mrad)
B1520 ●	1518.4	-90.1	-77.2	1.489	XCOR DR11 1520	7.2	huge
SEPT 1580	1608.5	0.0			no trim		
SEPT 1590	1608.5	0.0			no trim		

NDR Extraction Septum and NRTL B2 @ 750 MeV

I(LGPS) = 1570.7 amp (2510.0 @ 1.19 GeV)

Device	I (desired)	ΔI (main)	I (trim)	strength	trim powered by	I _{max} (trim)	$\Delta\theta$ (mrad)
SEPT 10	1570.7	0.0			no trim		
SEPT 20	1570.7	0.0			no trim		
B80 ●	1366.6	-204.1	-174.9	1.790	XCOR DR13 80	8.0	huge

SDR Injection Septum and SLTR B1 @ 750 MeV

I(LGPS) = 1609.5 amp (2571.6 @ 1.19 GeV)

Device	I (desired)	ΔI (main)	I (trim)	strength	trim powered by	I _{max} (trim)	$\Delta\theta$ (mrad)
B1521 ●	1516.1	-93.4	-80.0	1.494	XCOR DR01 1521	7.0	huge
SEPT 1581	1609.5	0.0			no trim		
SEPT 1591	1609.5	0.0			no trim		

SDR Extraction Septum and SRTL B2 @ 750 MeV

I(LGPS) = 1605.0 amp (2564.5 @ 1.19 GeV)

Device	I (desired)	ΔI (main)	I (trim)	strength	trim powered by	I _{max} (trim)	$\Delta\theta$ (mrad)
SEPT 11	1605.0	0.0			no trim		
SEPT 21	1605.0	0.0			no trim		
B81 ●	1387.5	-217.5	-186.4	1.883	XCOR DR03 81	7.3	huge

Things to do to run @ 750 MeV

NLTR

- need boost power supply (~30 amps) or separate power supply (~250 amps for 750 MeV) for NLTR VBs (120/370/450)
- need to install and power trim windings on NLTR B280, B290, B950, B960, B1210, B1250, and B1290 (Copely channels or equivalent)

SLTR

- QTRM 355 maxed out (wants 16.7 amps; max is 12) ... find another solution

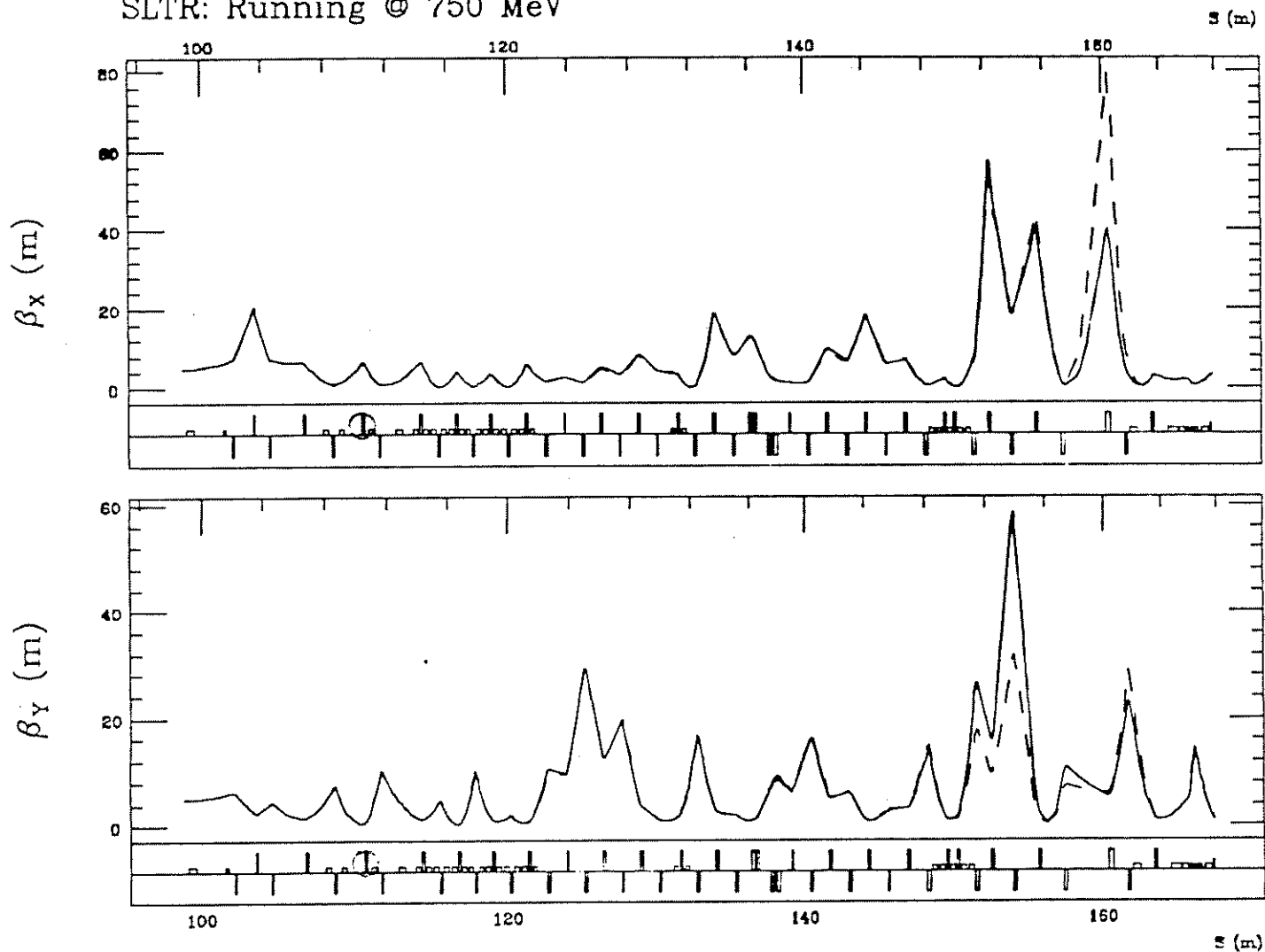
N/S RTL

- wire several pairs of adjacent existing trim windings on identical magnets in series and power with existing Copely channels (NRTL B190/200, B300/310, B370/380, B420/430, and SRTL B371/381)
- need to power trim winding on NRTL B510 (Copely channel or equivalent)
- need to shunt ~20 amps off HB0, NRTL B640, and SRTL B641 to get trims into range
- need to shunt ~25 amps off SRTL VB491 and SRTL VB791 to get trims into range
- remove short (1/2") PMQs; slide remaining long (1") PMQs downstream
- compressor voltage? bunch length from damping ring?

NDR/SDR Septa

- need to run NLTR B1 shunt @ ~-90 amps
 - need to run NRTL B2 shunt @ ~-204 amps
 - need to run SLTR B1 shunt @ ~-93 amps
 - need to run SRTL B2 shunt @ ~-218 amps
- } DO SHUNT BOXES STILL EXIST?
CAN SHUNTS AND CABLES HANDLE THESE CURRENTS?

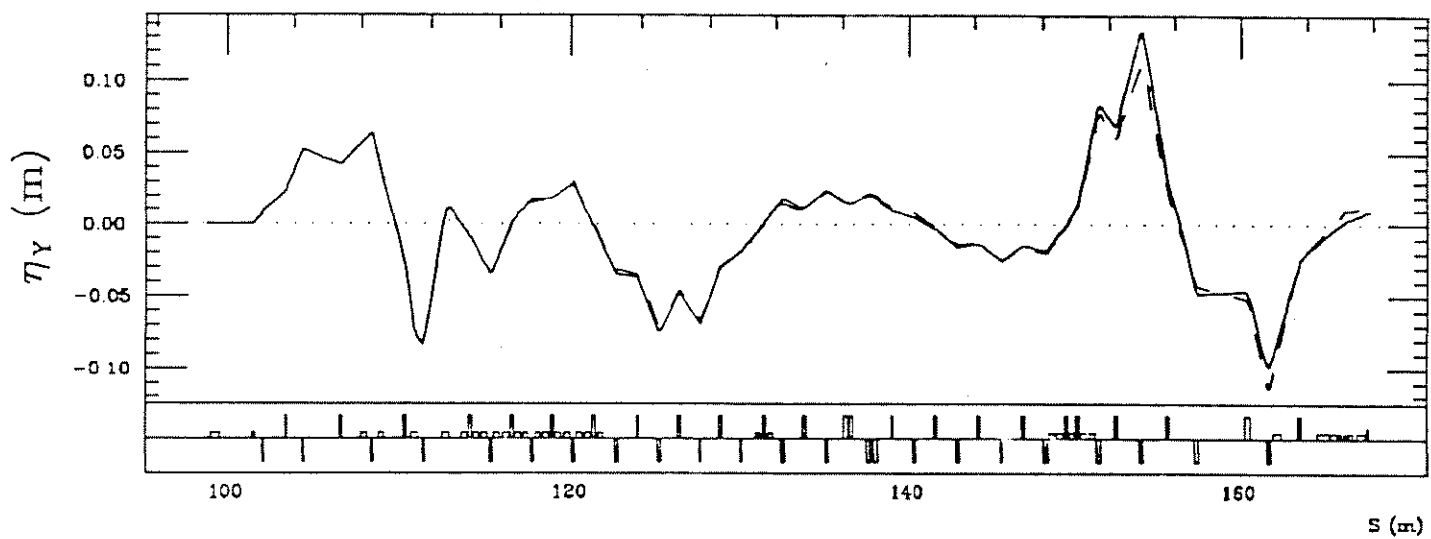
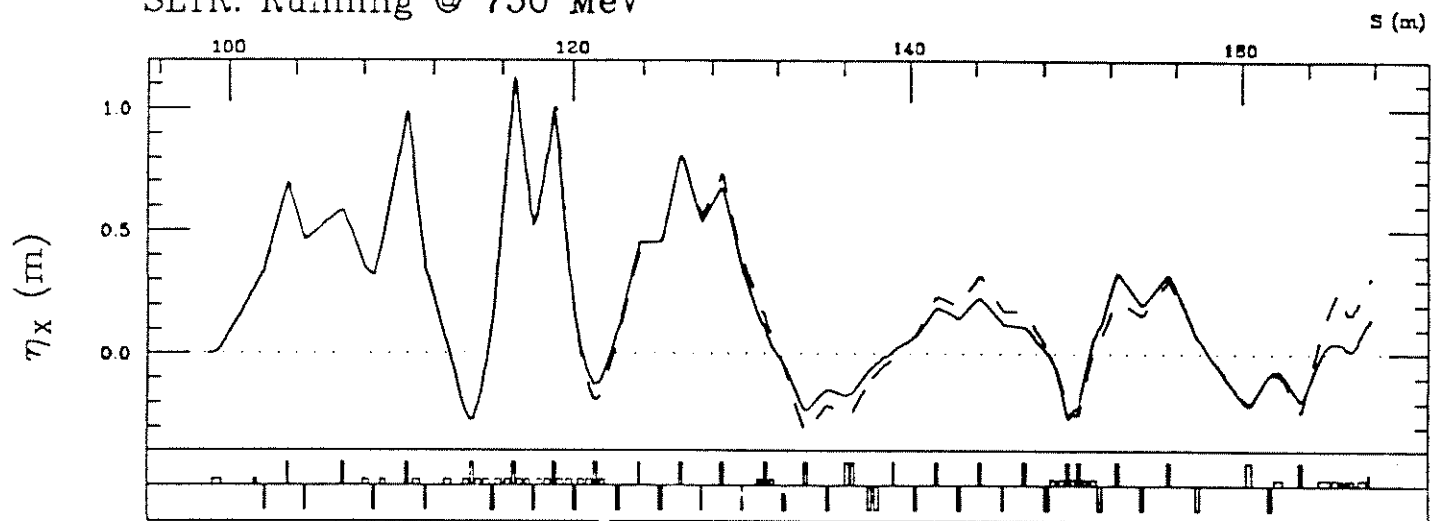
SLTR: Running @ 750 MeV



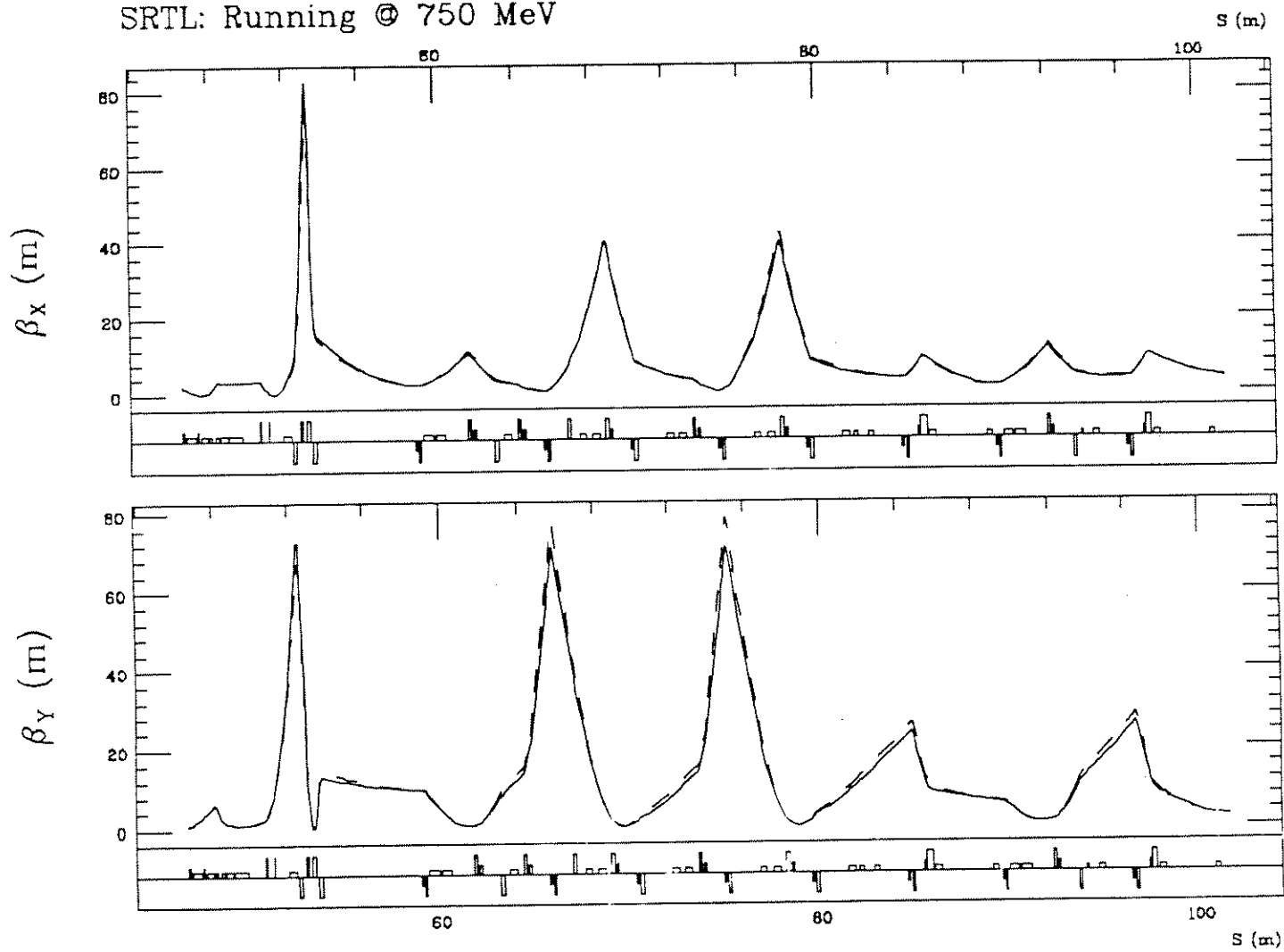
QTRM
355

NOTE: DASHED LINE IS PRESENT (1.17 GeV) LATTICE;
SOLID CURVE IS FIRST TRY AT MATCHING TO
PRESENT OPTICS AT 750 MeV

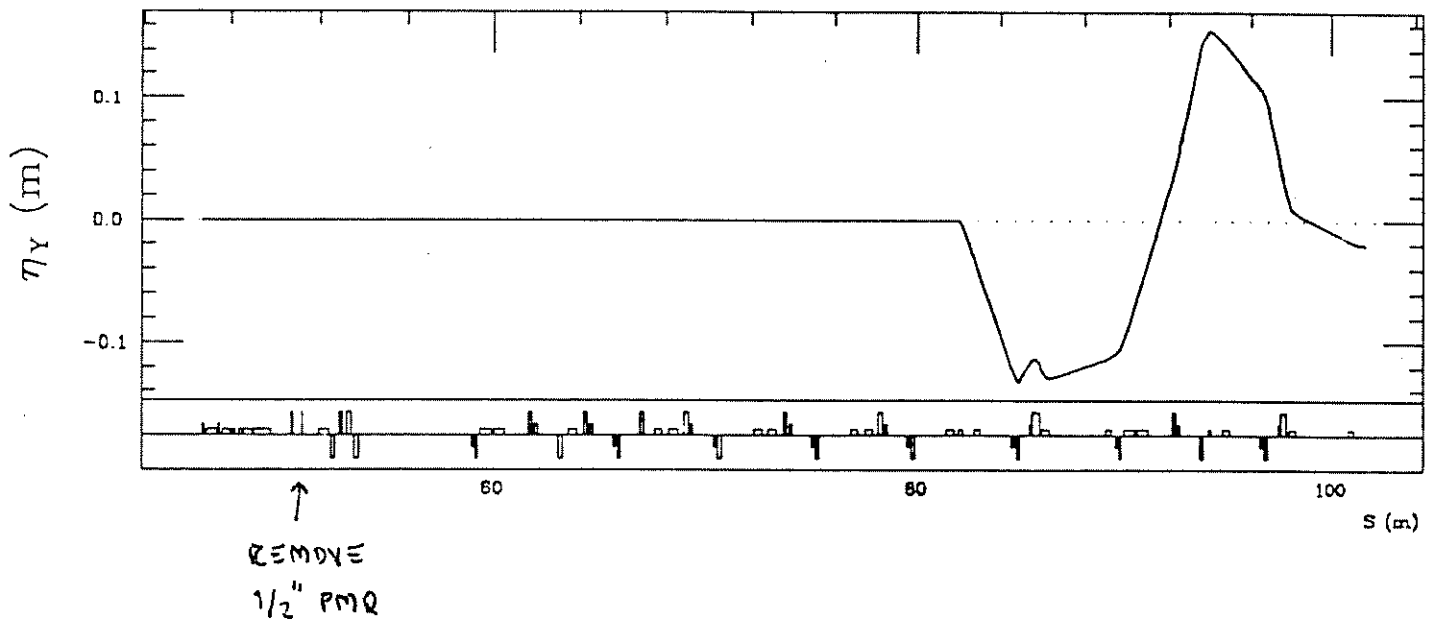
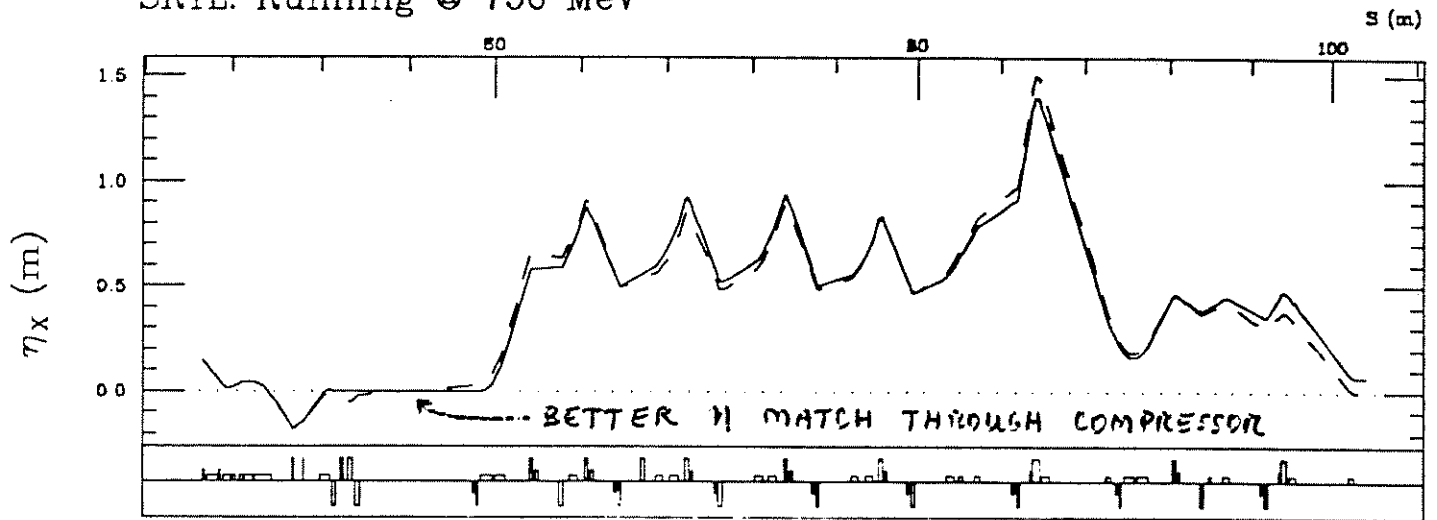
SLTR: Running @ 750 MeV



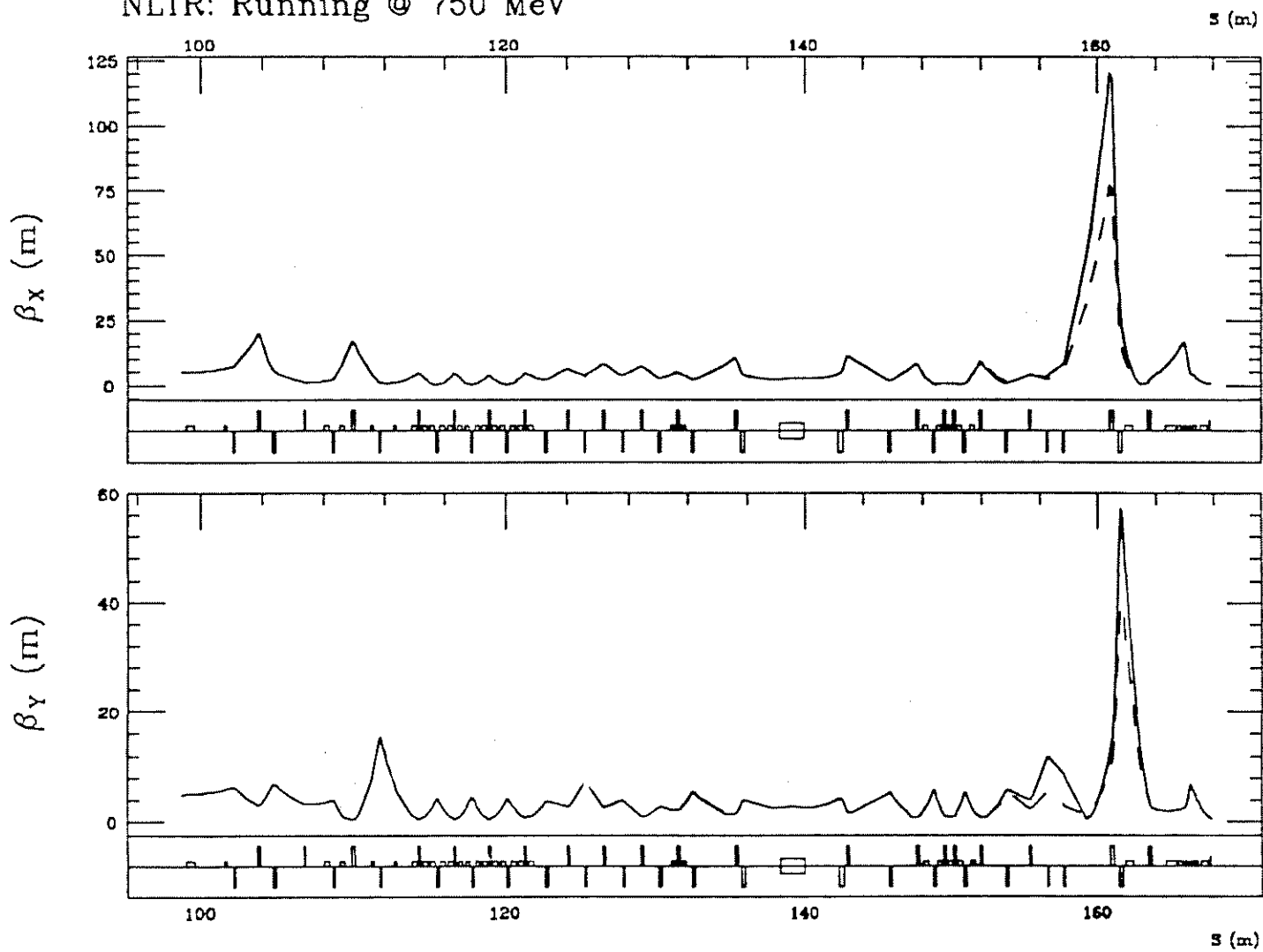
SRTL: Running @ 750 MeV



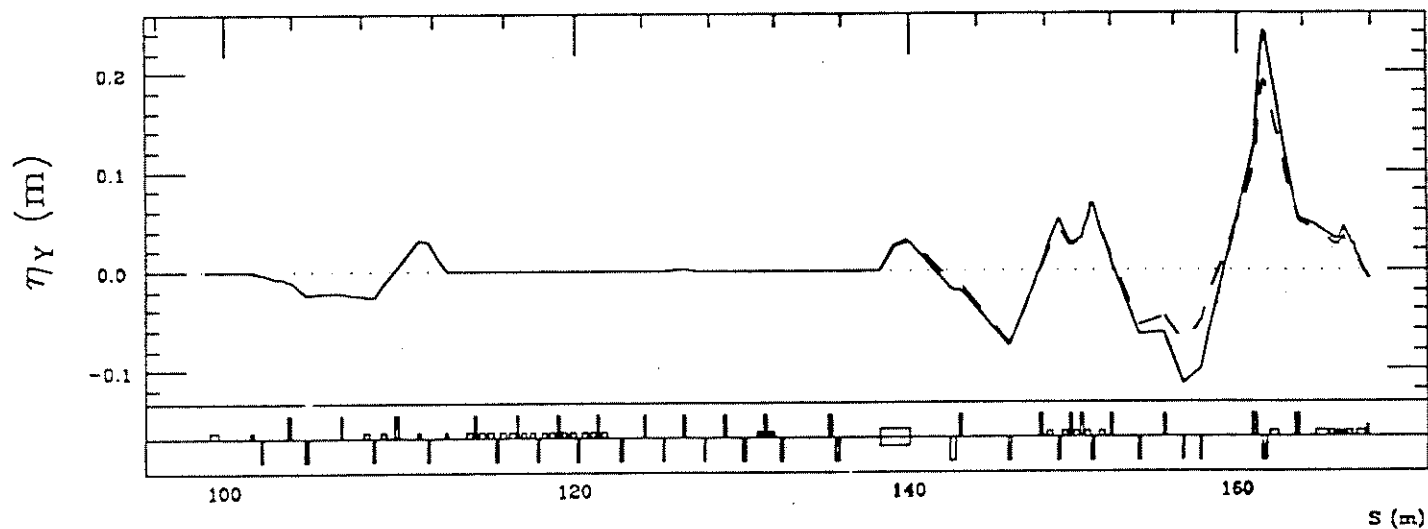
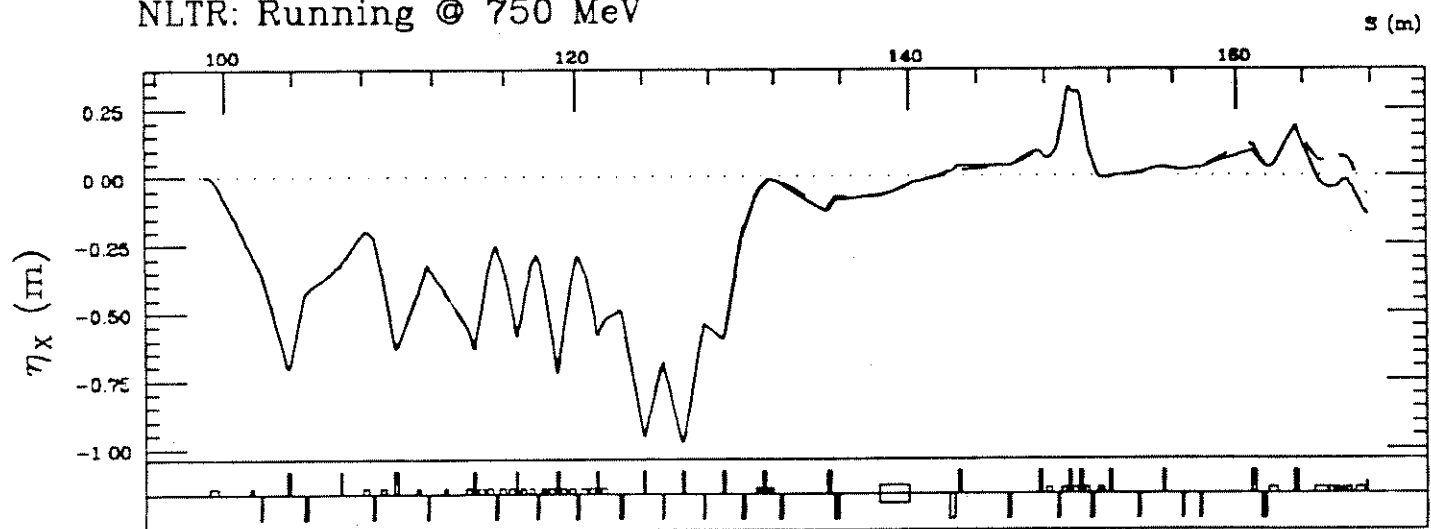
SRTL: Running @ 750 MeV



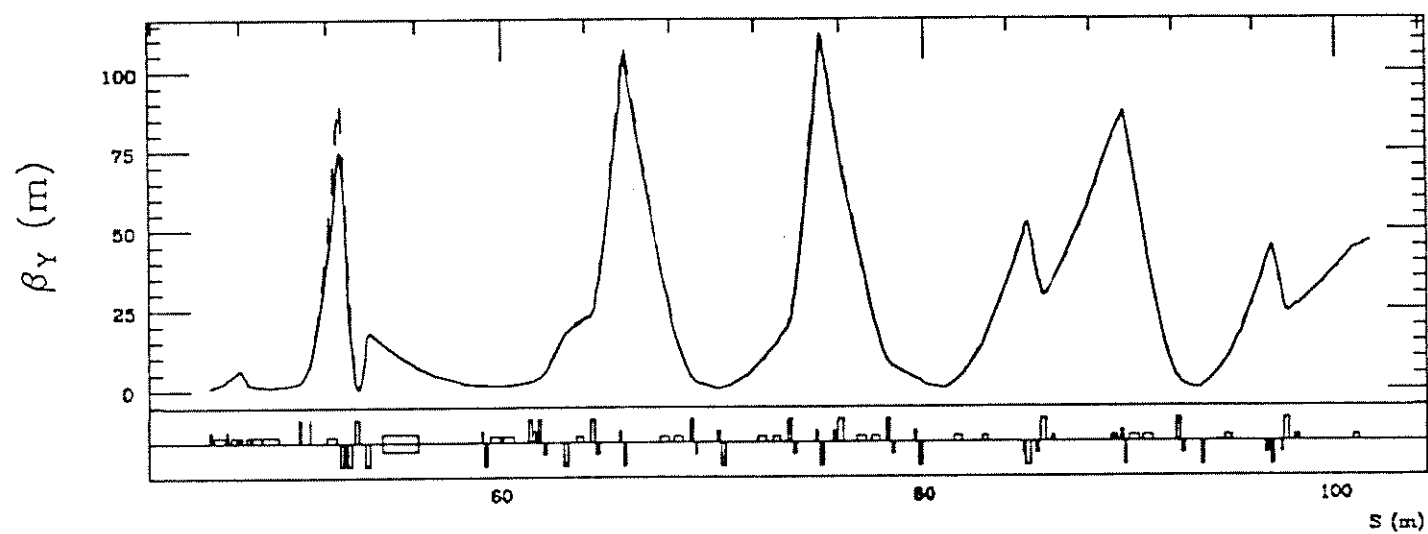
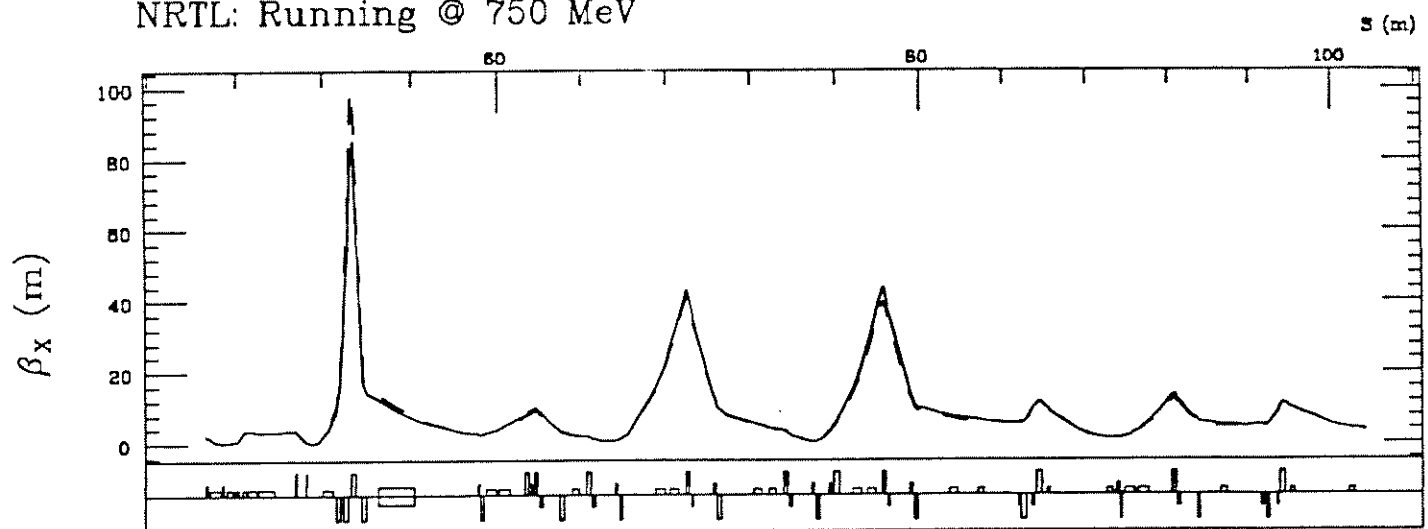
NLTR: Running @ 750 MeV



NLTR: Running @ 750 MeV



NRTL: Running @ 750 MeV



NRTL: Running @ 750 MeV

