

High- β Optics

H. Burkhardt LOC 11.04.2006

- **90 m early Totem optics
match for beam2
rematch to get tunes closer to standard physics
adjust tunes using IR4**
- **IR4 tuning range and attempt to adjust tune for
for high β totem + atlas**

Phase advance over IP5

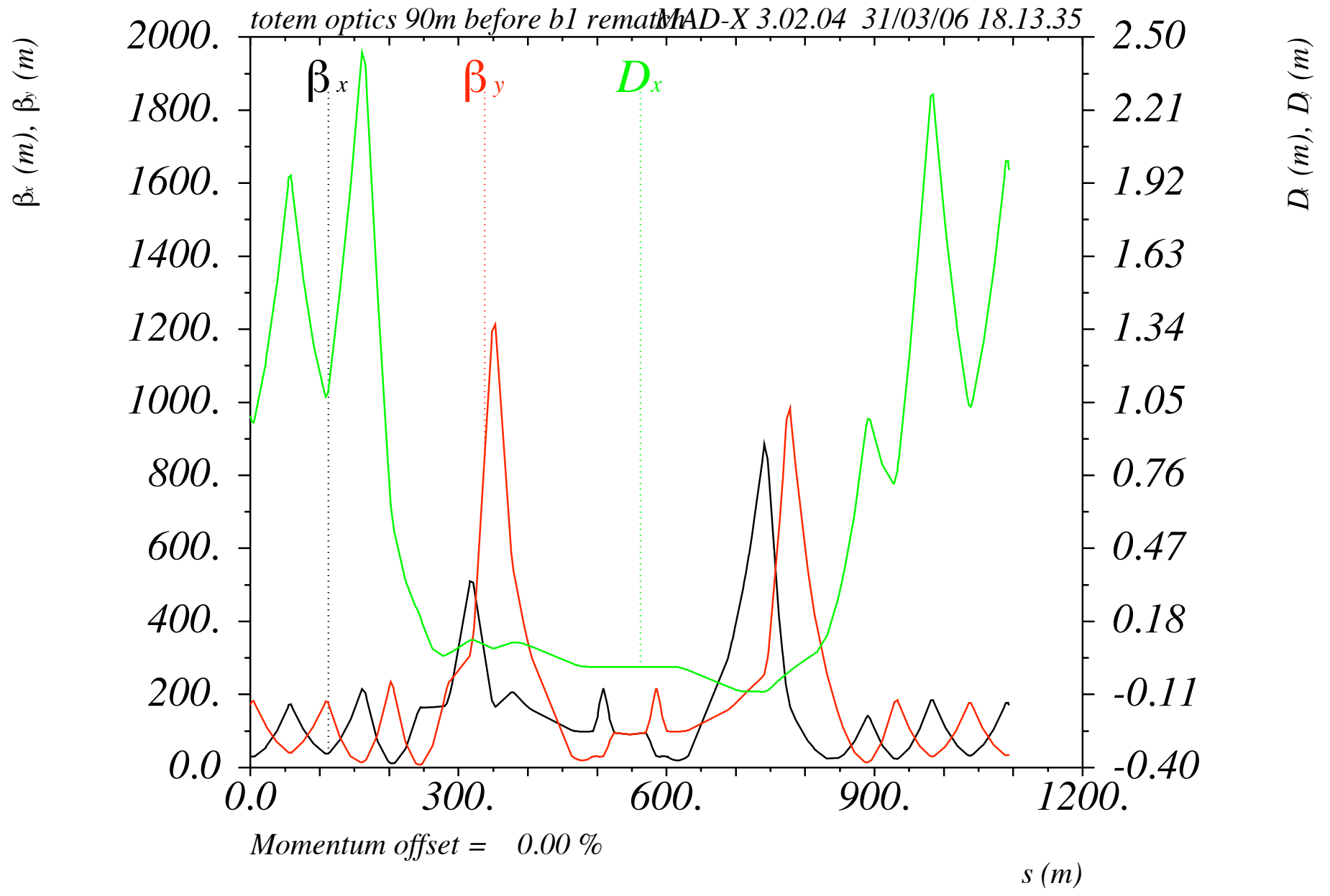
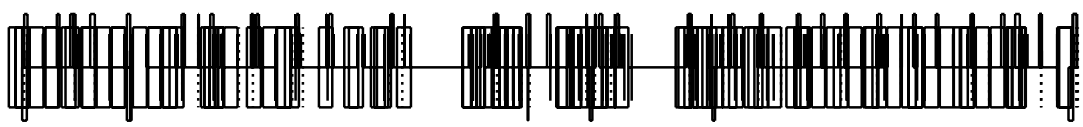
(range = s.ds.l5 / e.ds.r5)

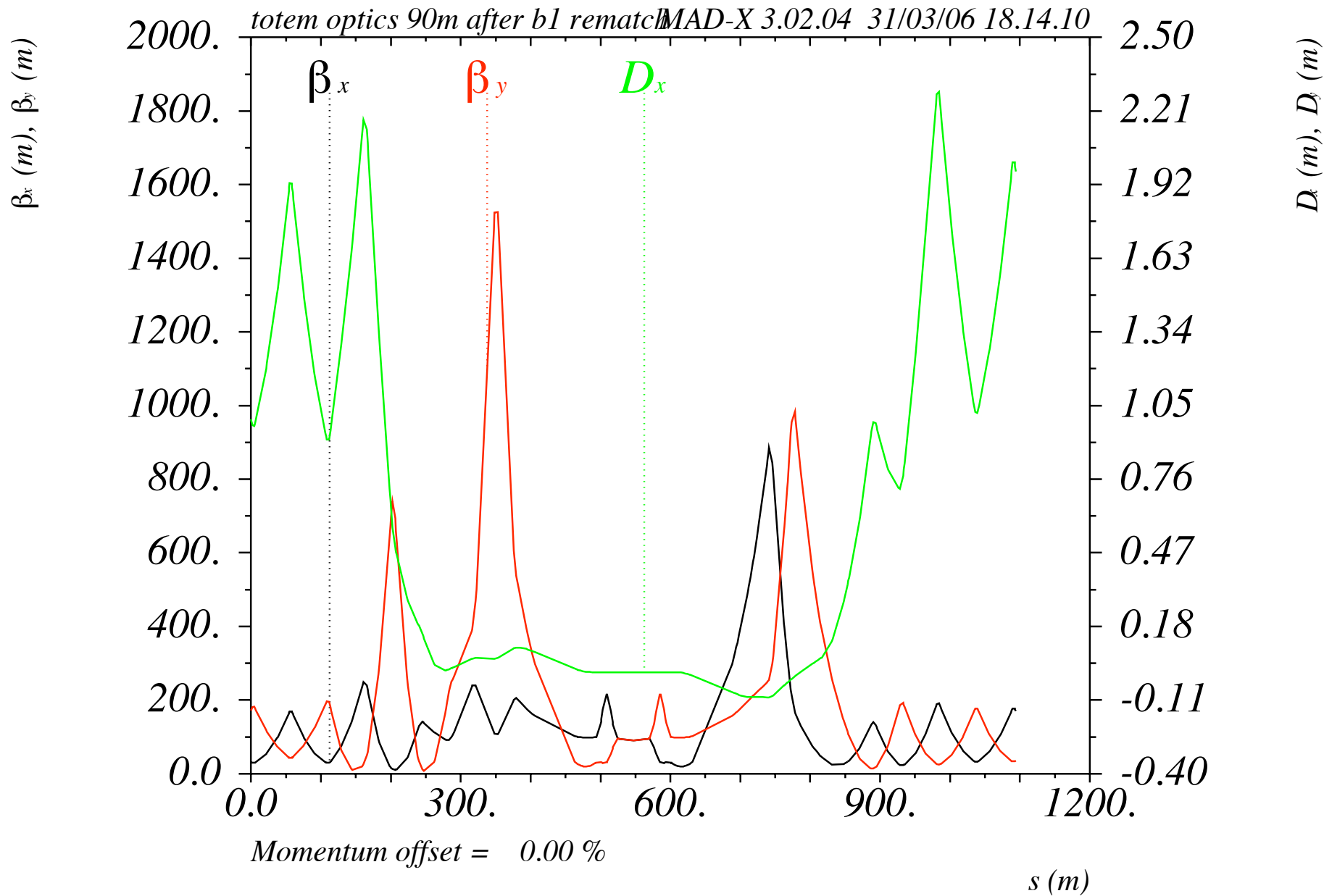
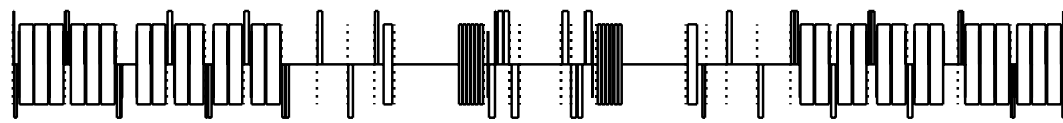
Q_x	Q_y	comment
2.618	2.644	Injection
2.633	2.649	Physics
2.449	2.528	90m Andre Verdier, Valentina Avati
0.184	0.121	difference
2.550	2.649	90m, my rematch
0.083	0.000	difference

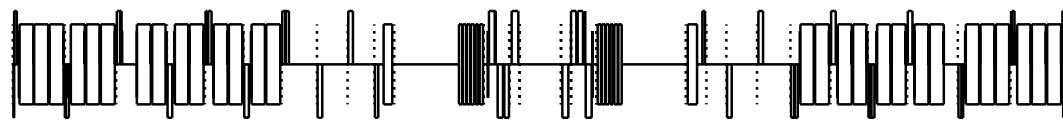
my rematch :

Q_x difference reduced by over 2x to well below 0.1

Q_y perfectly on physics tune.







totem optics 90m b2 rematched MAD-X 3.02.04 10/04/06 09.59.13

$\beta_x (m), \beta_y (m)$

2000.
1800.
1600.
1400.
1200.
1000.
800.
600.
400.
200.
0.0

β_x

β_y

D_x

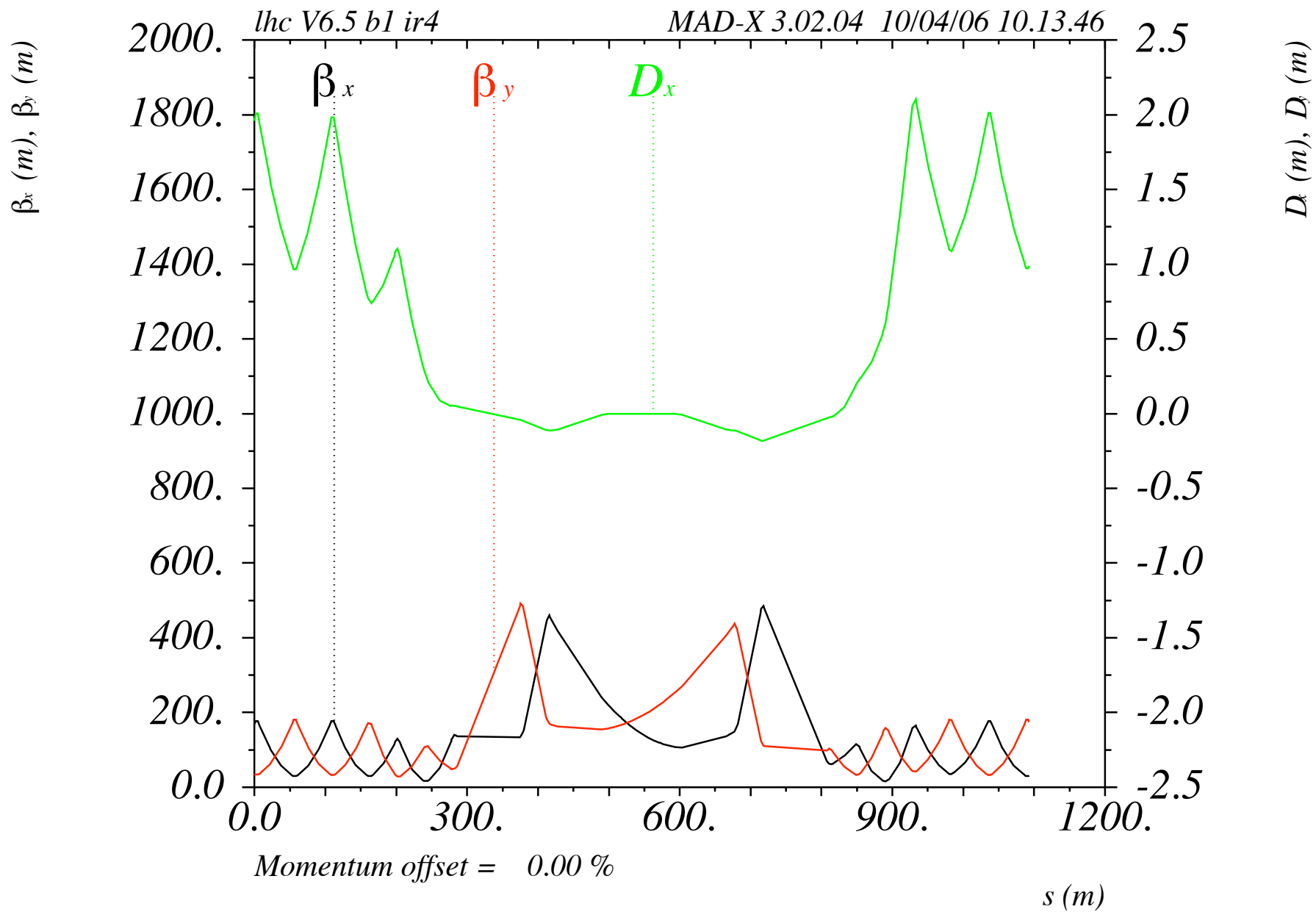
$D_x (m), D_y (m)$

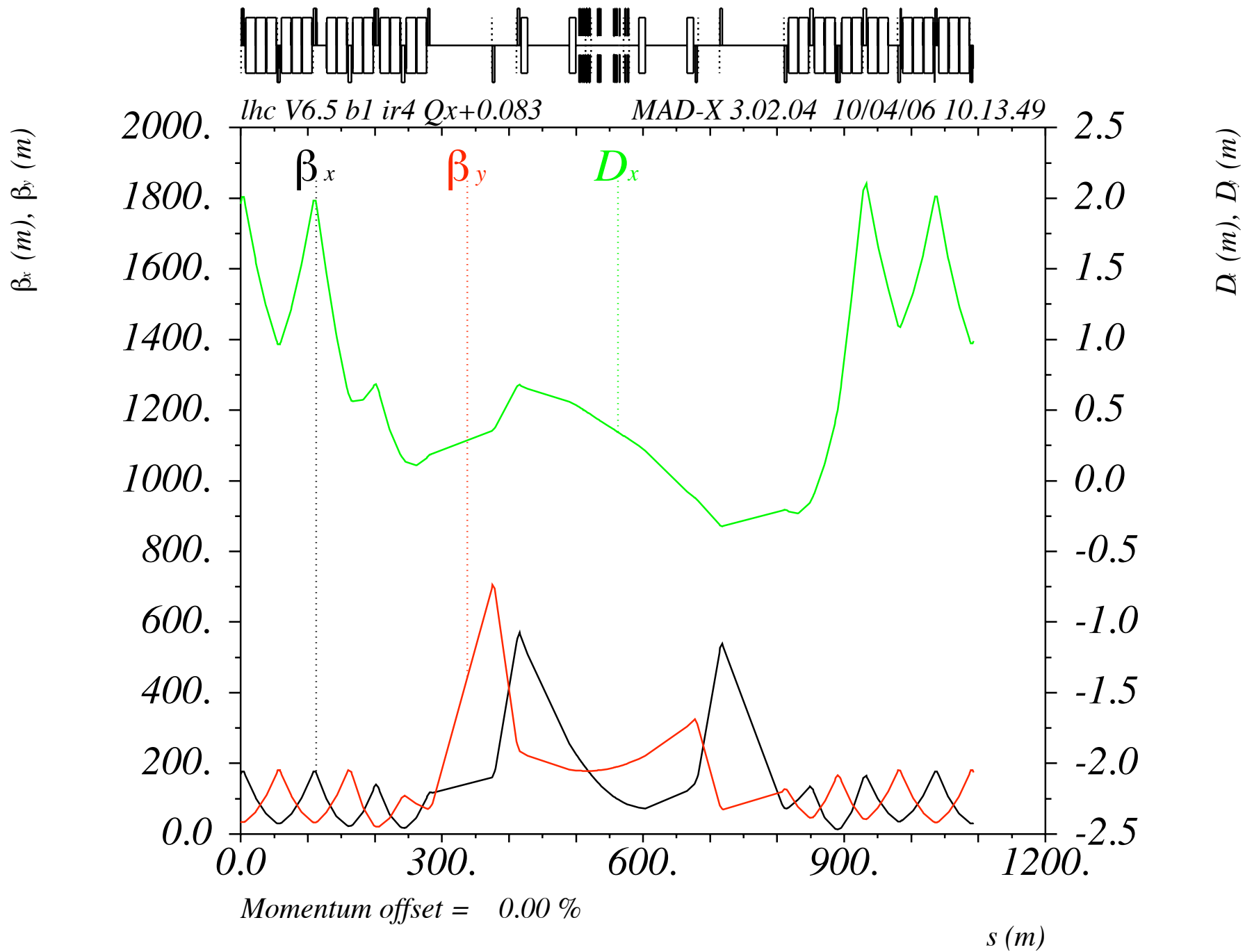
2.50
2.21
1.92
1.63
1.34
1.05
0.76
0.47
0.18
-0.11
-0.40

Momentum offset = 0.00 %

$s (m)$

0.0 300. 600. 900. 1200.





90 m early totem optics ; Status

totem request for written statement on 90 m for next (May 10) LHCC

**fully matched beam 1 and 2 ip5 for totem (incl. π , $\pi/2$ constraint at rp4 at 220 m)
+ small tune adjust ir4**

available for tests:

[/afs/cern.ch/user/h/hbu/public/IP5_beta90_IR4.str](afs.cern.ch/user/h/hbu/public/IP5_beta90_IR4.str)

Tune adjust for high β Totem + Atlas

Q_x	Q_y	comment
0.239	0.557	ΔQ Φ - Atlas 2540 m
-.059	0.565	ΔQ Φ - Totem 1540 m
0.180	1.122	ΔQ Atlas and Totem

Trial: rematch the 0.18 / 0.122 tune difference with IR4 to get to 64.31 / 58.32
/afs/cern.ch/user/h/hbu/public/hbutest_HighBetaAtlas+Totem+IR4.str (beam 1)

β_x increases to nearly 2000m. Still, from first look - aperture not limited in ir4 but rather ir1/5 (~tas).

Maybe this is already acceptable for special high β running? --->

$\beta_x (m), \beta_y (m)$

3500.
3150.
2800.
2450.
2100.
1750.
1400.
1050.
700.
350.
0.0

β_x

β_y

D_x

3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
-1.0
-1.5
-2.0
-2.5
-3.0

$D_x (m), D_y (m)$

0.0 10.0 20.0 30.0

Momentum offset = 0.00 %

$s (m) [*10^{**}(3)]$

