1911-work-v5

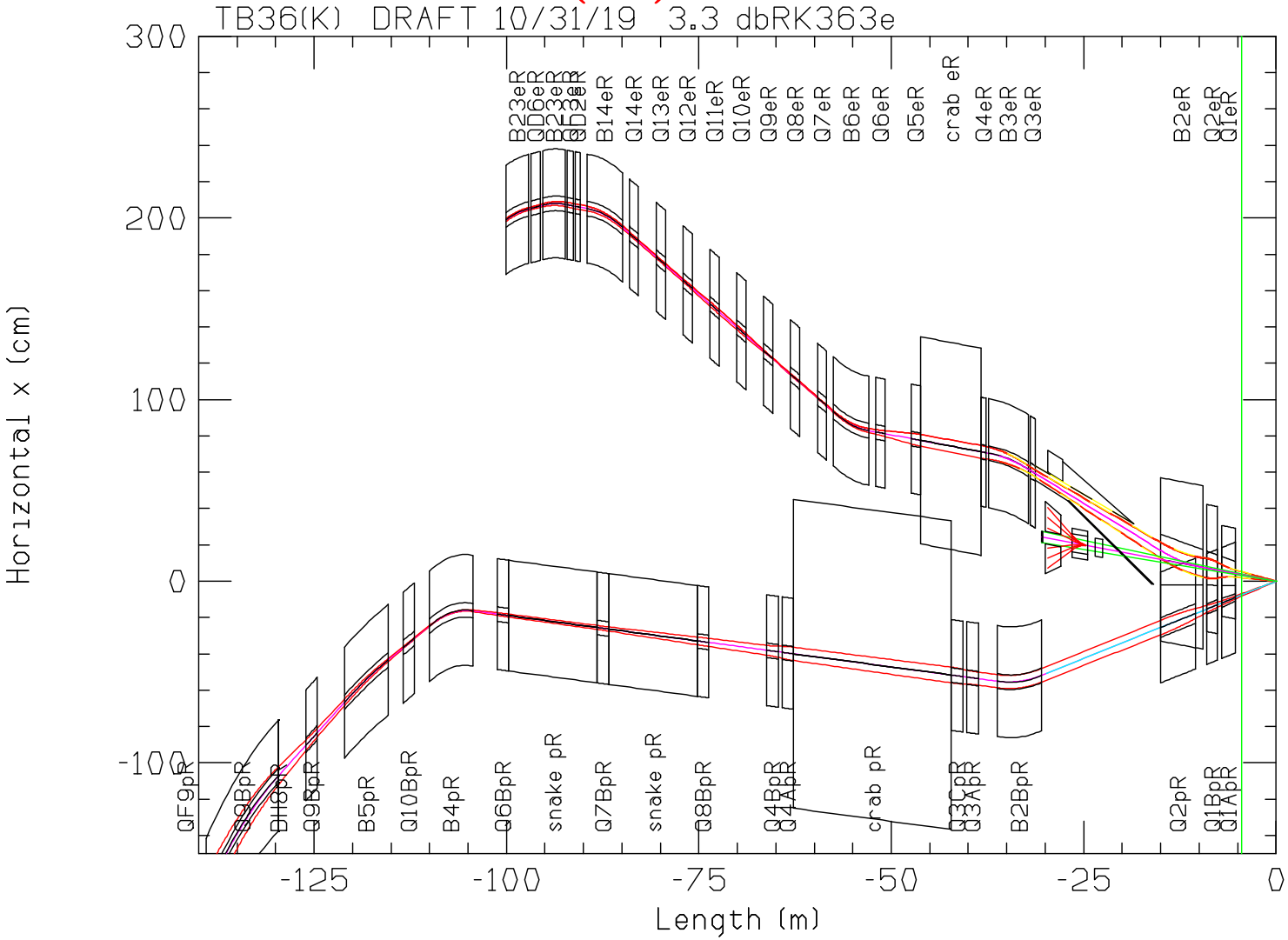
12/13/19

Electron lattice options

- Rear Baseline (K)
- Rear new with B3 & B6 set to zero (N)

- Forward Baseline (b)
- Forward crab moved 5 m (e)
- Forward Holger reversed crab-bend (h)

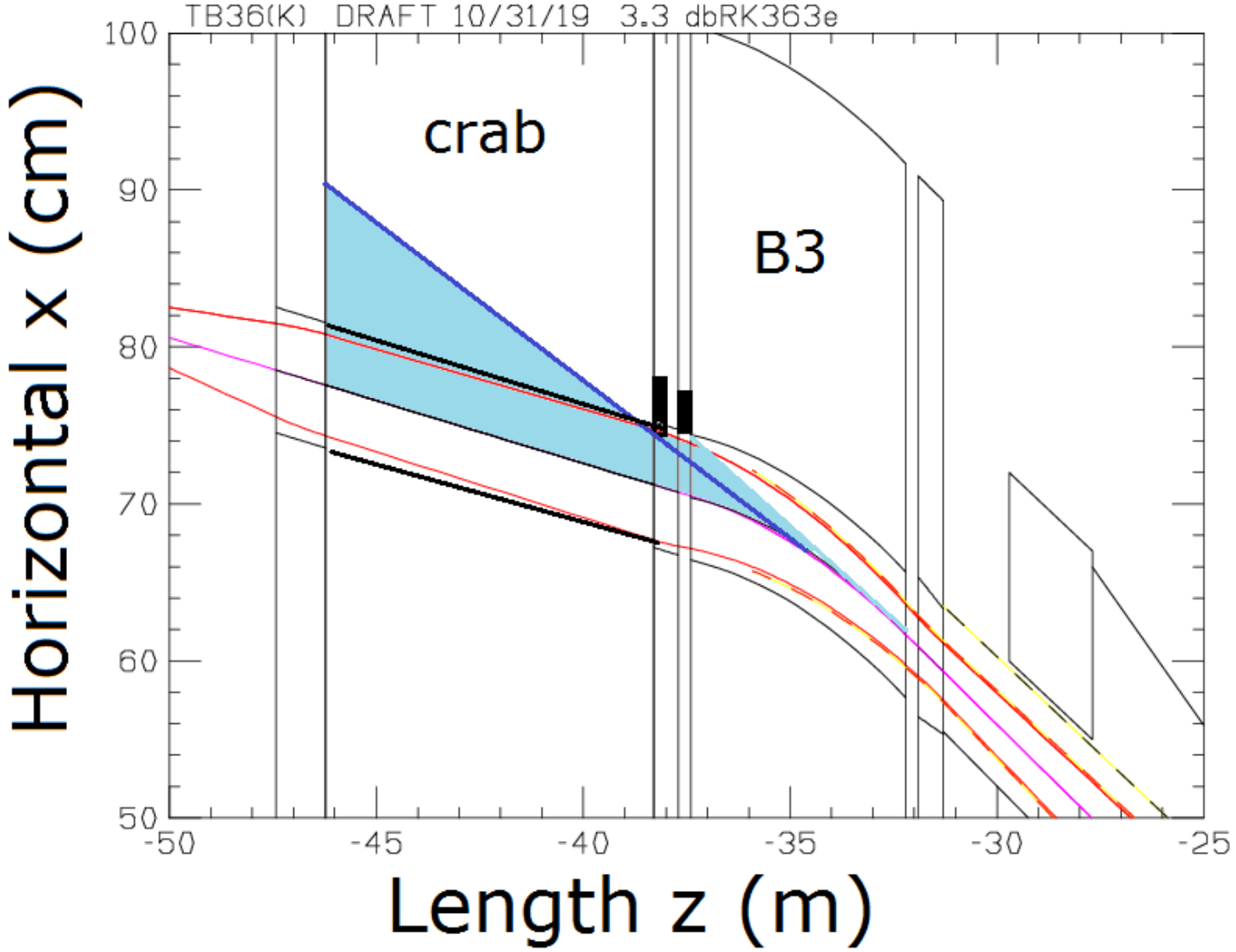
REAR Baseline (K)



SR from B3eR enters crab eR

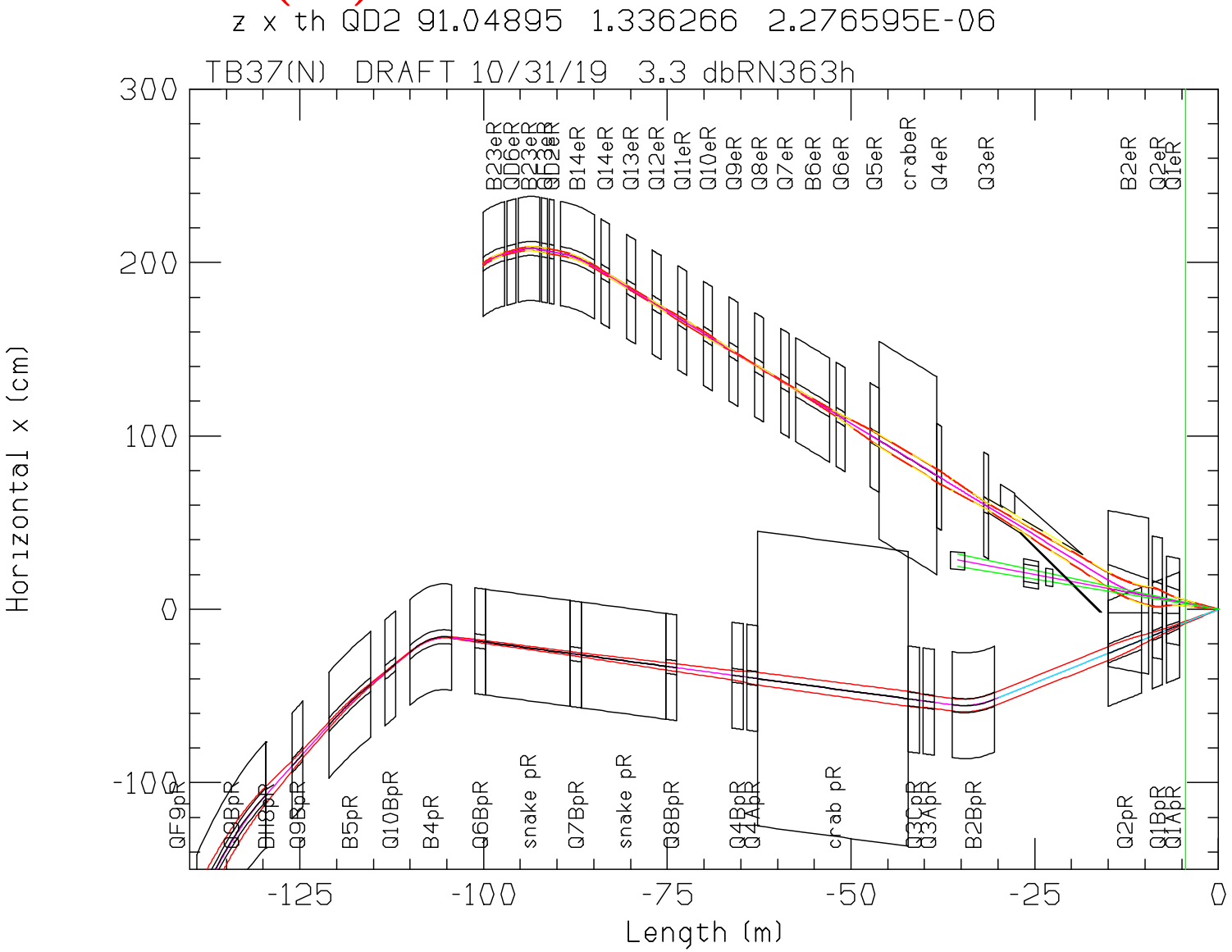
Interference p amd e crabs and high fields

SR from B3 in crab



Bend immediately before crab will give disasterous SR

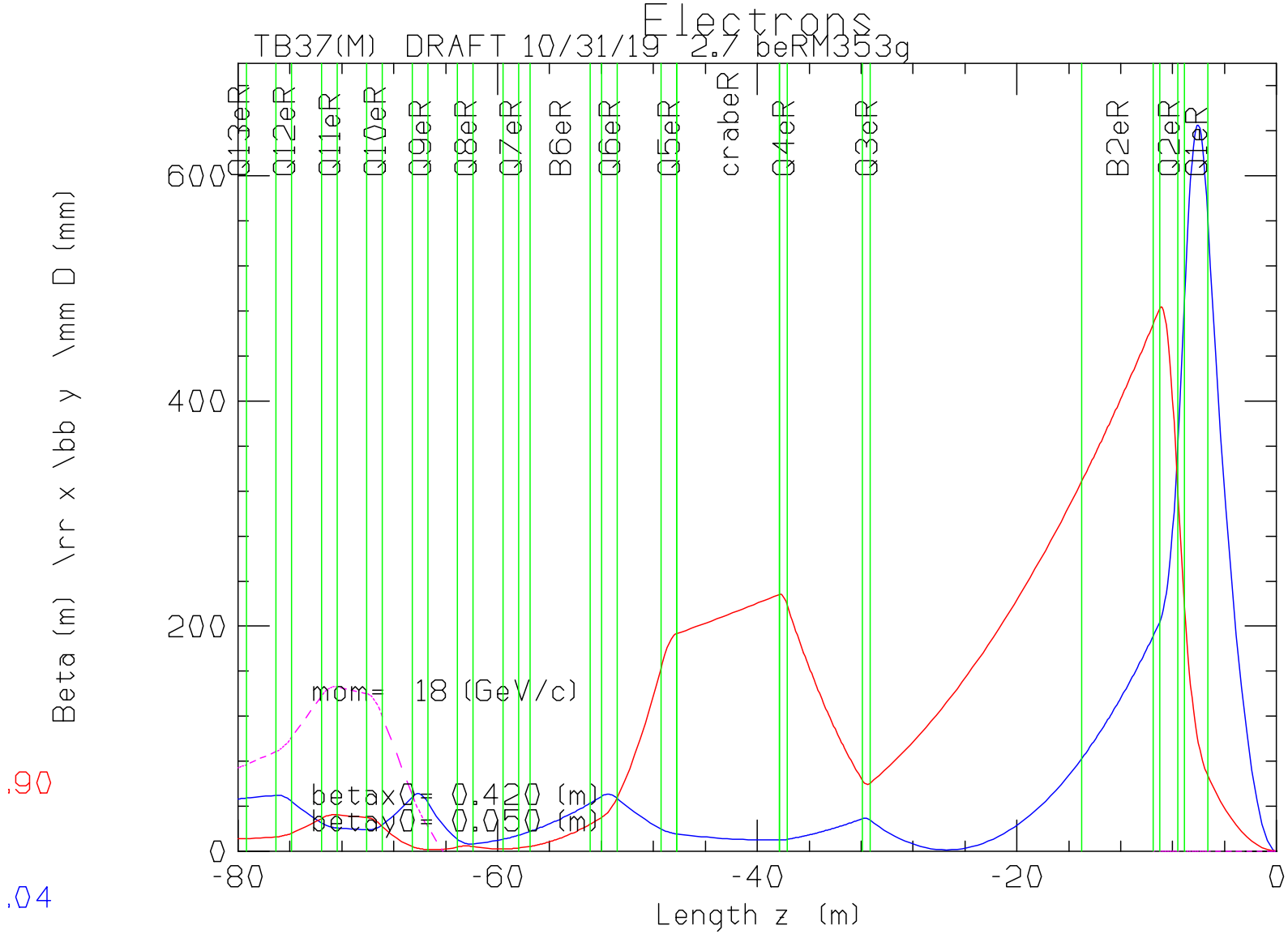
Version (N)



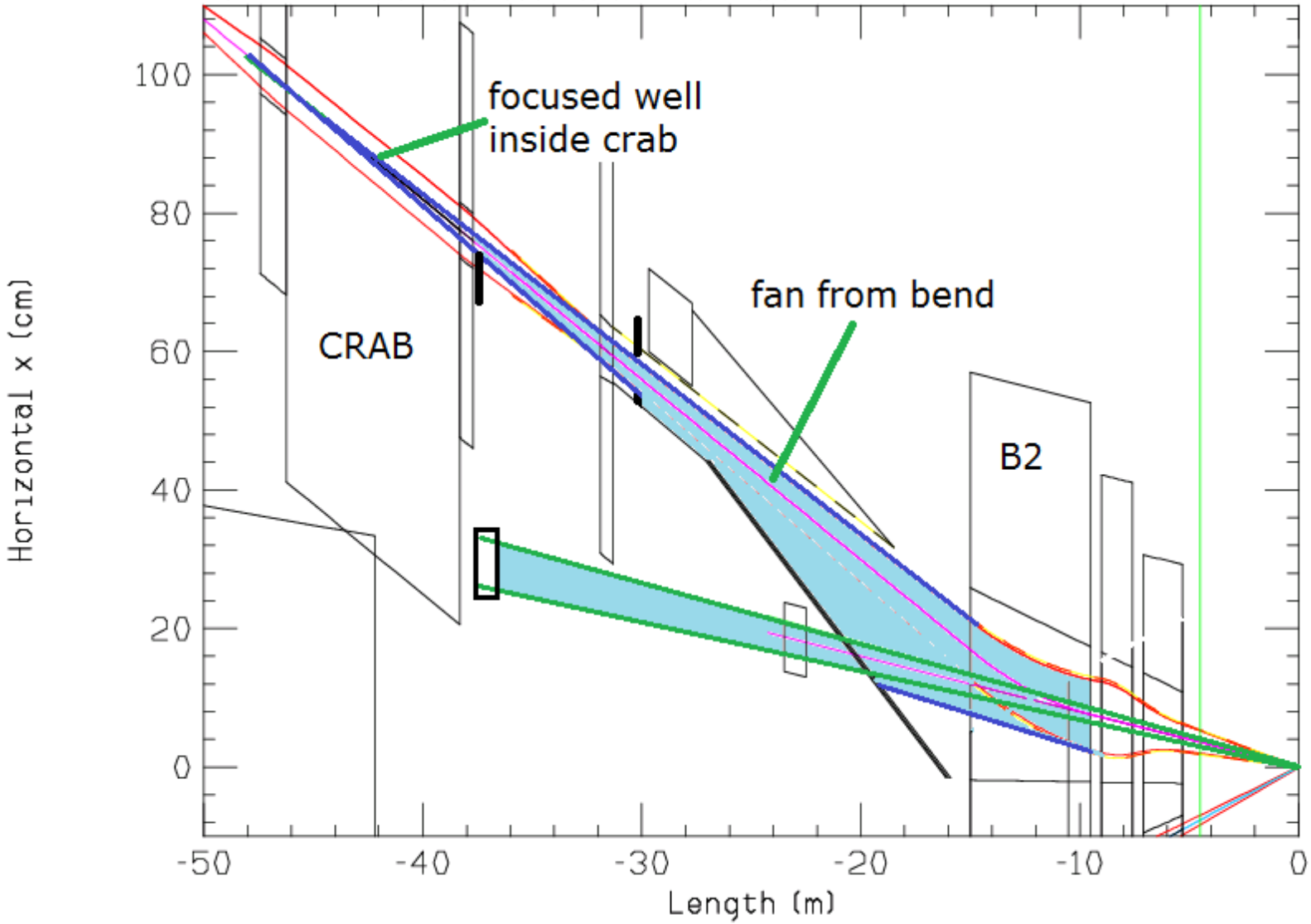
No interference

Lower fields

Betas version (K, L, or N)



SR in version (N)



Masks shown give excessive protection

Impedance problems will be less with more open masks

Discussion

- For version (L) I kept the magnets close to the IP (Q1, Q2, B2) the same to avoid changing the physics simulations
- When I do this and do a geometrical match, I need a very low field in B6
- In Version (N) B6 is also zeroed but now B2 is slightly reduced
- But in both (L) and (N) (I) had some problems in the geometrical matching
- No further reduction of B2 because of crab interferances

	B2	B3	B6	B14
Baseline K	-.196	.208	.378	.378
Version L	-.196	0	.009	.198
Version N	-.194	0	0	.232

Parameters for (N)

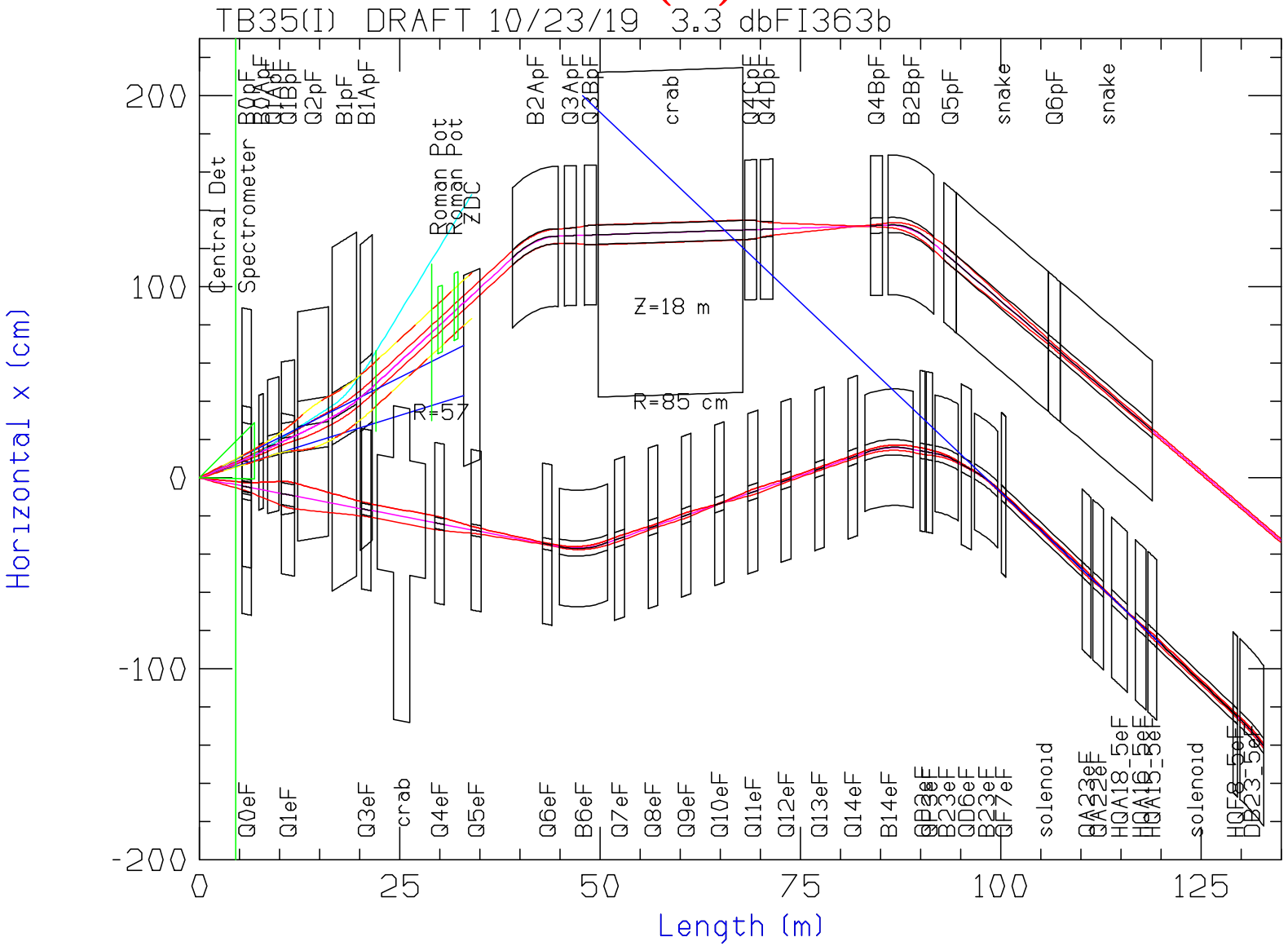
```
#
# ------------------------------------
# TB37(N)  DRAFT 10/31/19  zbRN363h Hadron Rear  275
#
# beta*_x  beta*_y  gm emit_x gm emit_y  angle_x  angle_y    mom
#  [m]      [m]      [nm]     [nm]     [mrad]    [mrad]     GeV/c
 0.9000   0.0590     20.3000    8.5000      25       0       275
#
# name    center_z center_x rad1  rad2  length  angle     B      grad   ap x grad
#           [m]      [m]     {m}   [m]    [m]   [mrad]    [T]    [T/m]     [T]
  Q1ApR   -6.200   0.0000  0.020  0.026   1.80    0.0   0.000   -92.400    -2.363
  Q1BpR   -8.300   0.0000  0.028  0.028   1.40    0.0   0.000   -81.950    -2.295
  Q2pR  -12.750   0.0000  0.054  0.054   4.50    0.0   0.000    31.331     1.692
  B2BpR  -33.348   0.0330  0.040  0.040   5.70   11.6  -3.649     0.000     0.000
  Q3ApR  -39.448   0.1385  0.040  0.040   1.50   22.7   0.000   -71.118    -2.845
  Q3CpR  -41.448   0.1838  0.040  0.040   1.50   22.7   0.000    62.847     2.514
  Q4ApR  -63.448   0.6830  0.040  0.040   1.50   22.7   0.000    75.954     3.038
  Q4BpR  -65.448   0.7283  0.040  0.040   1.50   22.7   0.000   -90.035    -3.601
  Q8BpR  -74.448   0.9325  0.040  0.040   1.50   22.7   0.000     7.847     0.314
  Q7BpR  -87.448   1.2275  0.040  0.040   1.50   22.7   0.000   -33.266    -1.331
  Q6BpR  -100.448   1.5224  0.040  0.040   1.50   22.7   0.000    57.108     2.284

# ------------------------------------
# TB37(N)  DRAFT 10/31/19  zbRN363h Electron Rear  18
#
# beta*_x  beta*_y  gm emit_x gm emit_y  angle_x  angle_y    mom
#  [m]      [m]      [nm]     [nm]     [mrad]    [mrad]     GeV/c
 0.4200   0.0500     24.0000    2.4200      25       0        18
```

```
#
# name    center_z center_x rad1  rad2  length  angle     B      grad   ap x grad
#           [m]      [m]     {m}   [m]    [m]   [mrad]    [T]    [T/m]     [T]
  Q1eR   -6.200   0.1550  0.066  0.079   1.80   25.0   0.000   -14.467    -1.150
  Q2eR   -8.300   0.2075  0.083  0.094   1.40   25.0   0.000    14.186     1.330
  B2eR  -12.250   0.3063  0.097  0.139   5.50   25.0  -0.194     0.000     0.000
  Q3eR  -31.600   1.1348  0.040  0.045   0.60   42.8   0.000   -23.200    -1.032
  Q4eR  -38.000   1.4088  0.040  0.040   0.60   42.8   0.000     8.900     0.356
  Q5eR  -46.830   1.7869  0.040  0.040   1.20   42.8   0.000     5.900     0.236
  Q6eR  -51.395   1.9824  0.040  0.040   1.20   42.8   0.000    -8.800    -0.352
  B6eR  -55.195   2.1451  0.040  0.040   4.60   42.8   0.000     0.000     0.000
  Q7eR  -58.995   2.3078  0.040  0.040   1.20   42.8   0.000     1.300     0.052
  Q8eR  -62.489   2.4574  0.040  0.040   1.20   42.8   0.000    29.700     1.188
  Q9eR  -65.983   2.6070  0.040  0.040   1.20   42.8   0.000   -16.950    -0.678
  Q10eR -69.476   2.7566  0.040  0.040   1.20   42.8   0.000    10.450     0.418
  Q11eR -72.970   2.9062  0.040  0.040   1.20   42.8   0.000     6.450     0.258
  Q12eR -76.464   3.0558  0.040  0.040   1.20   42.8   0.000    -5.800    -0.232
  Q13eR -79.958   3.2053  0.040  0.040   1.20   42.8   0.000    -1.500    -0.060
  Q14eR -83.451   3.3549  0.040  0.040   1.20   42.8   0.000    -1.800    -0.072
  B14eR -87.251   3.4967  0.040  0.040   4.60   33.7   0.232     0.000     0.000
  QD2eR -90.752   3.6051  0.040  0.040   0.60   25.0   0.000     8.000     0.320
```

FORWARD

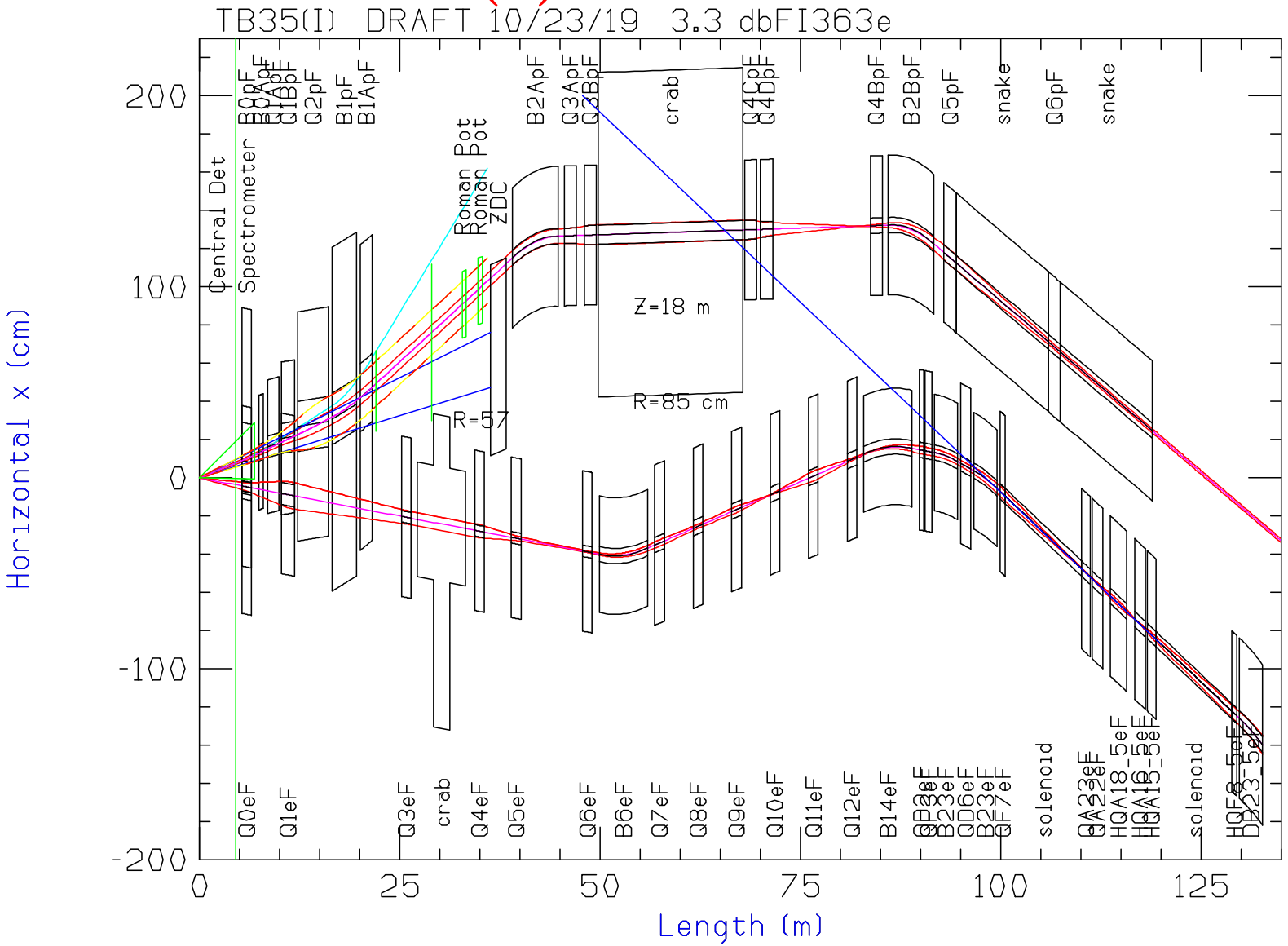
baseline from Steve (b)



dogleg bends 0.226 T interferance with n cone

B6 start at 45 m B6 fan at IP 3.08 cm

shift crab 5 m (e)



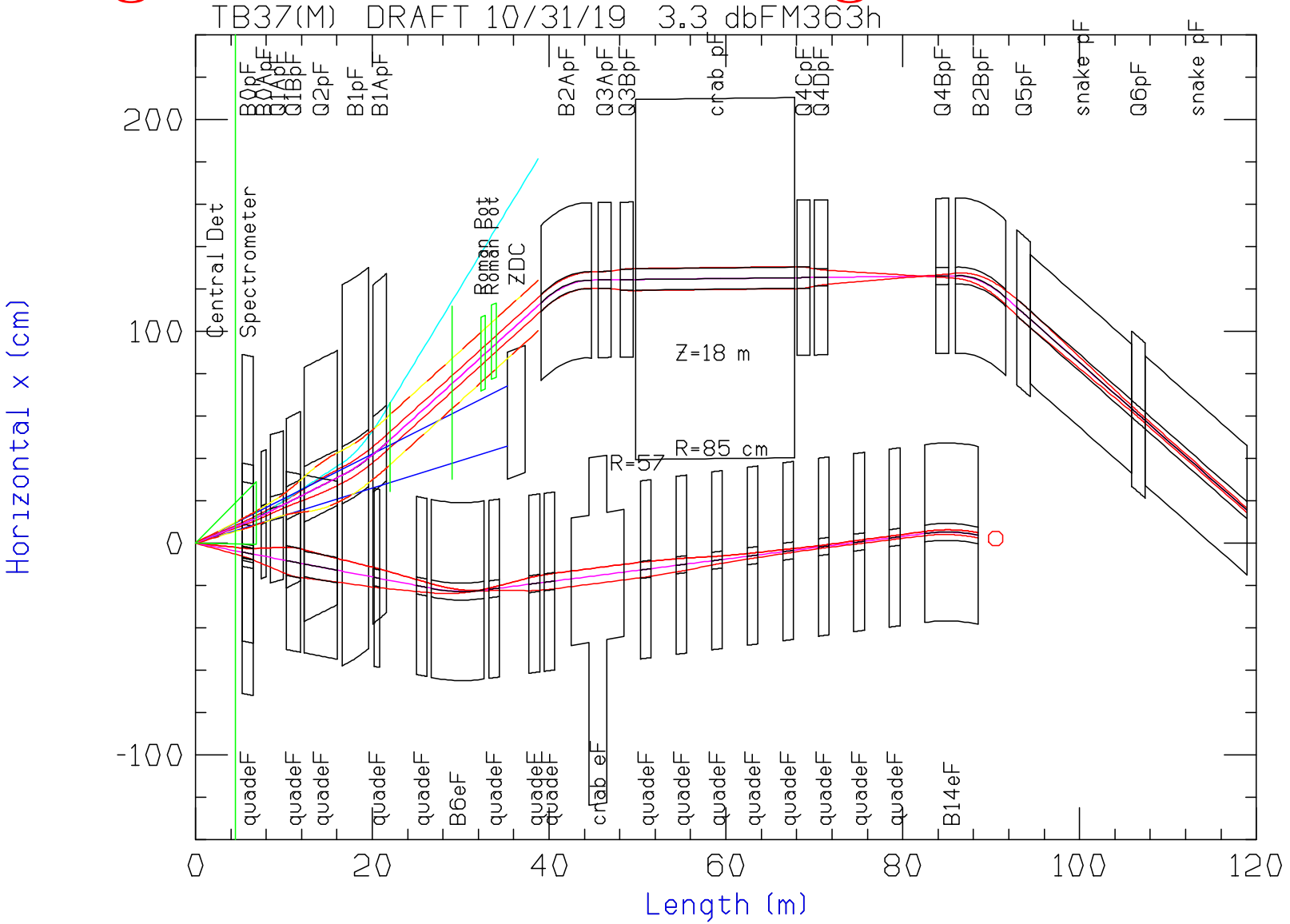
interferance ok

dogleg bends 0.262 T (16%)

bend start 50 m

B6 fan at IP 3.05 cm

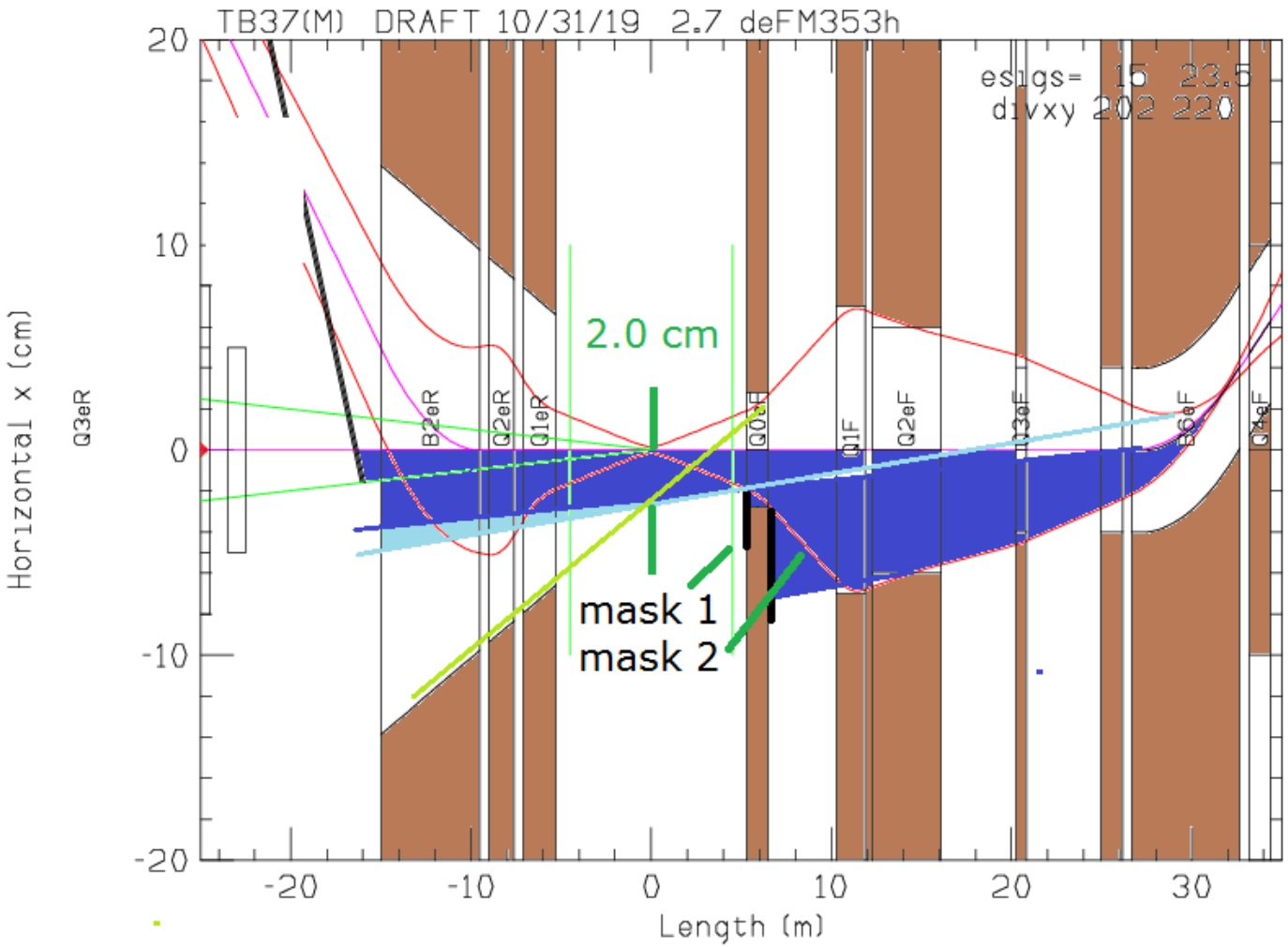
Holger's crab-bend exchanged



interfereence good dogleg bends 0.133 T (16%)

B6 start 27 m B6 fan at IP 3.3 cm

Holger example B6 SR fan in IP



Mask 1 placed on IP side of Q0 it must be cooled

Mask 2 placed upstream of Q0 also cooled

Location set by 15 sigma beam size

Summery of cases

Case	B_{B6}	$z1_{B6}$	x_o	δ
	T	m	cm	cm
Baseline	.226	45	1.87	-6
move 5 m	.262	50	1.85	+ 6
Holger	.133	27	2.00	+ 12.6
cf quads			2.60	

δ space 4 mrad cone and 57 cm crab or 42 cm magnet

- Baseline has interferance and unacceptable
- + 5 m has no interferance, but Strong B6 field giving less polarization
- Holger has best polarization, but slightly wider, though weaker, fan at IP
- Colimation proposed by Mike will help