1911-work-v3

11/22/19

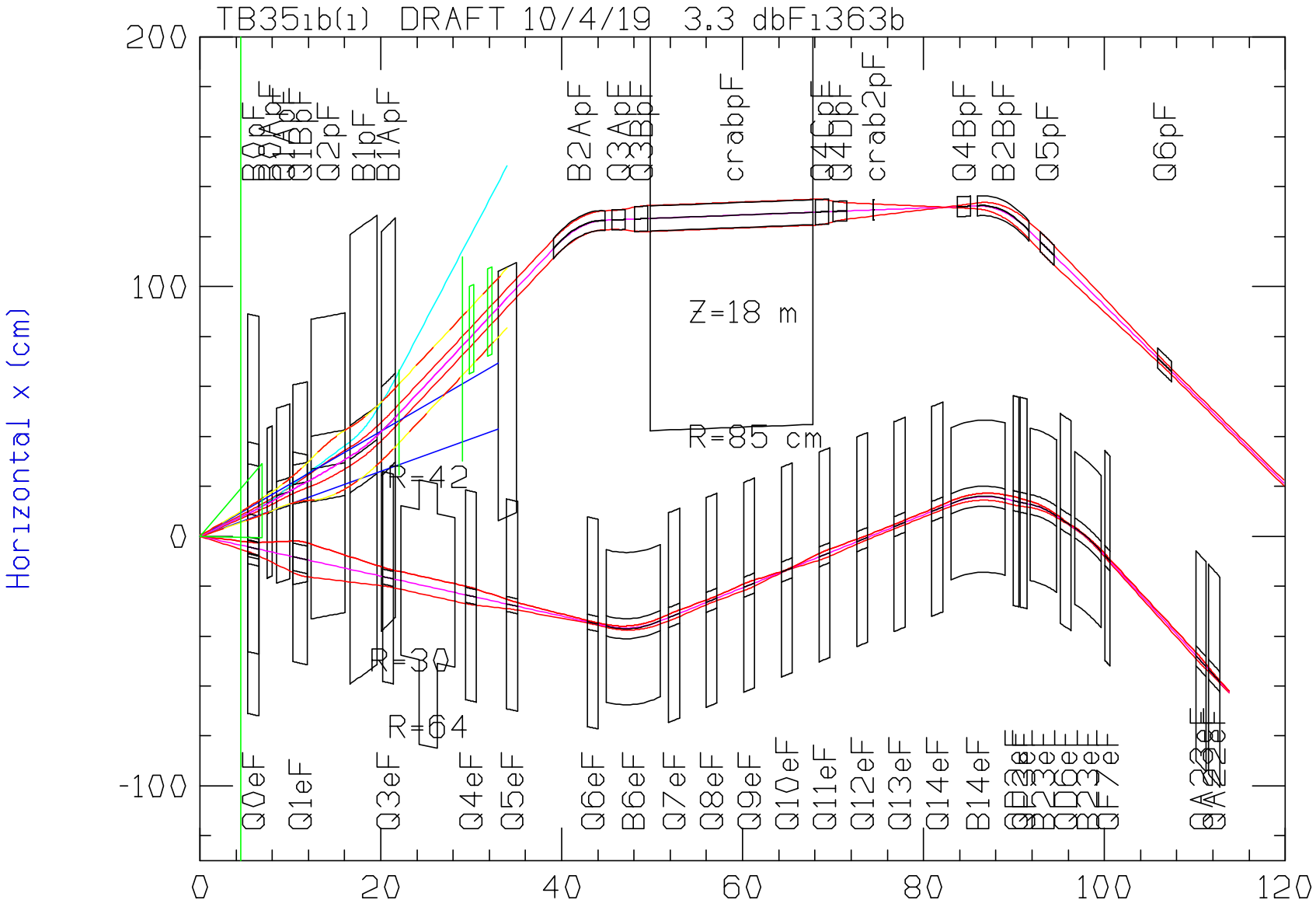
Electron lattice options

- Forward baseline (b)
- Forward with B6 moved to right by 5 m (e)
- Forward with crab and B6 interchanged (g)

- Rear Baseline (K)
- Rear baseline with B6 set to zero (L)

FORWARD

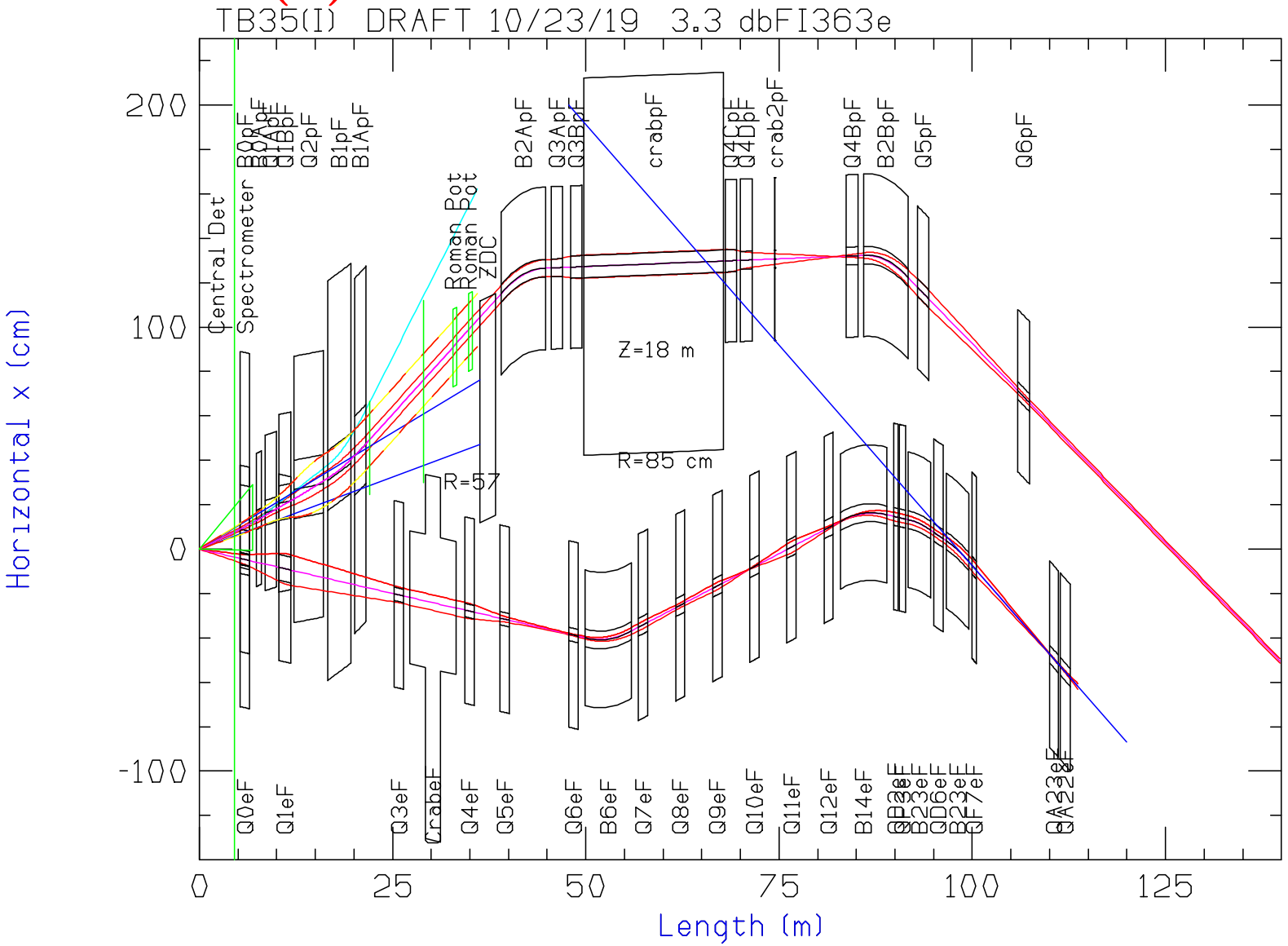
Baseline (b) Layout



B6 eF =0.226 T

Many problems inc. crab overlapping neutral cone

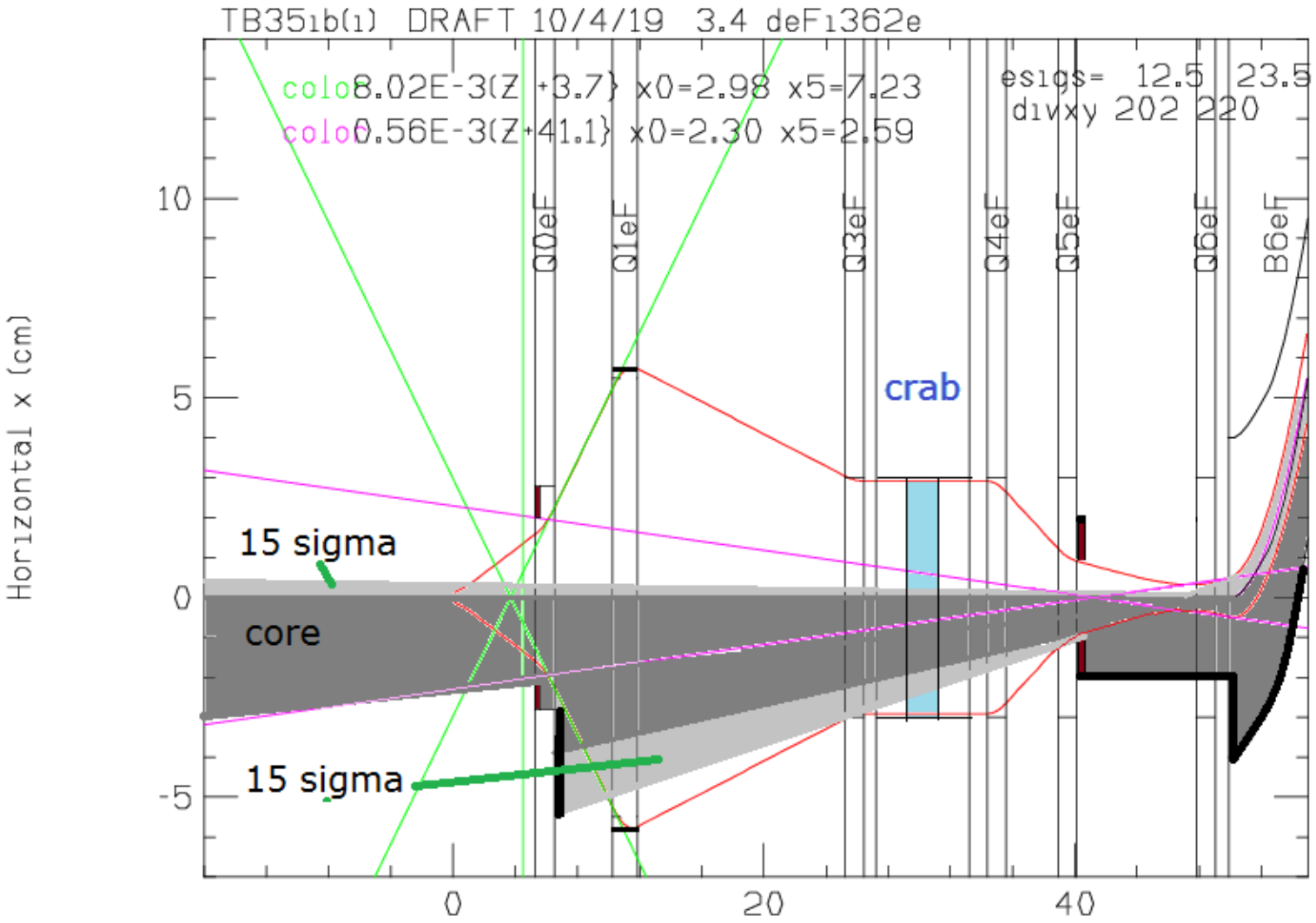
Version (e) with crab and B6eF moved 5 m



Fixed worse problems, but increased dog leg fields

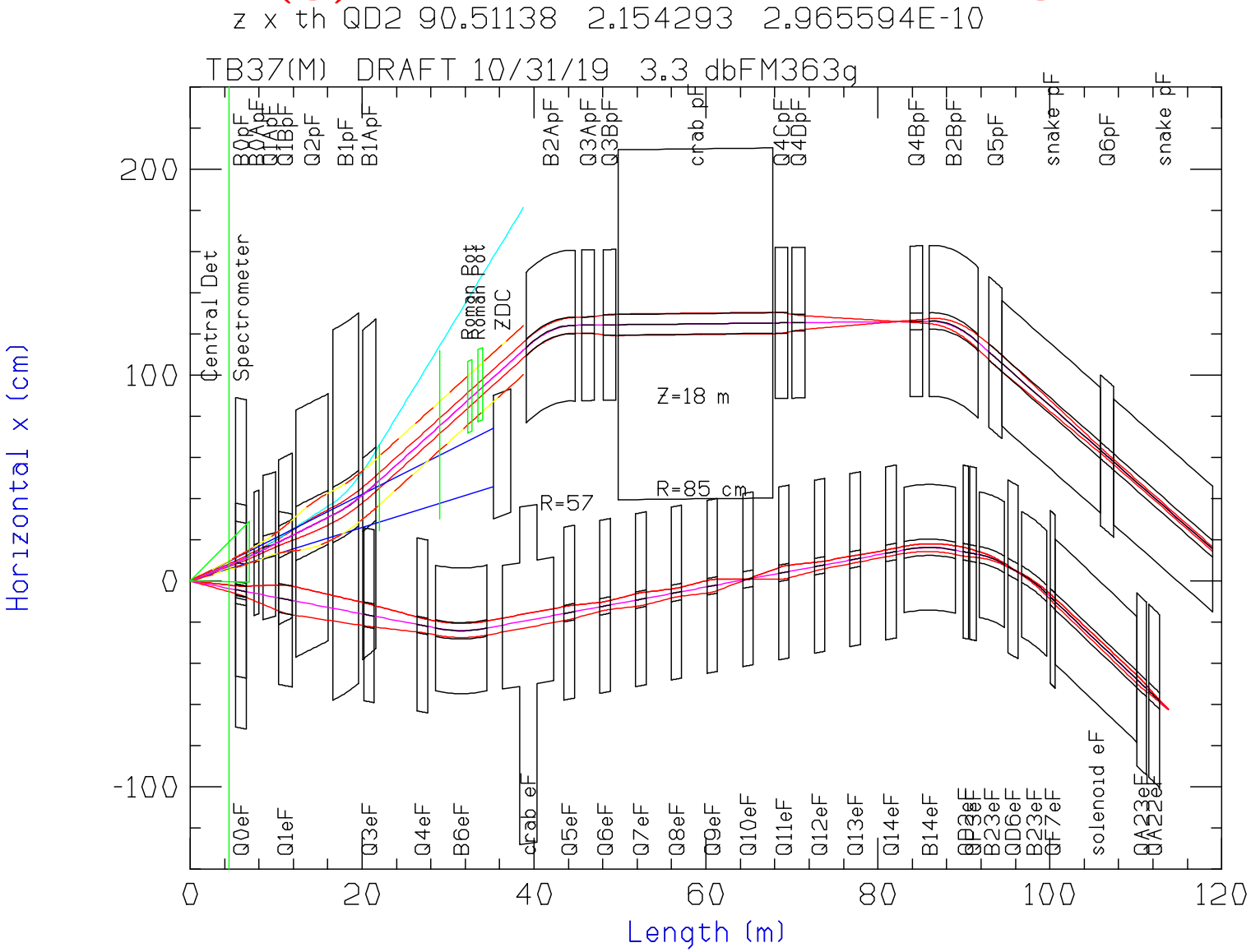
B6 eF = .262 T depolarization 34% more than base

SR from B6 in version (e)



Stronger Q5eF after crab allows mask further in is just ok
But required masks may have impedance problems

Version (g) B6 and crab exchanged



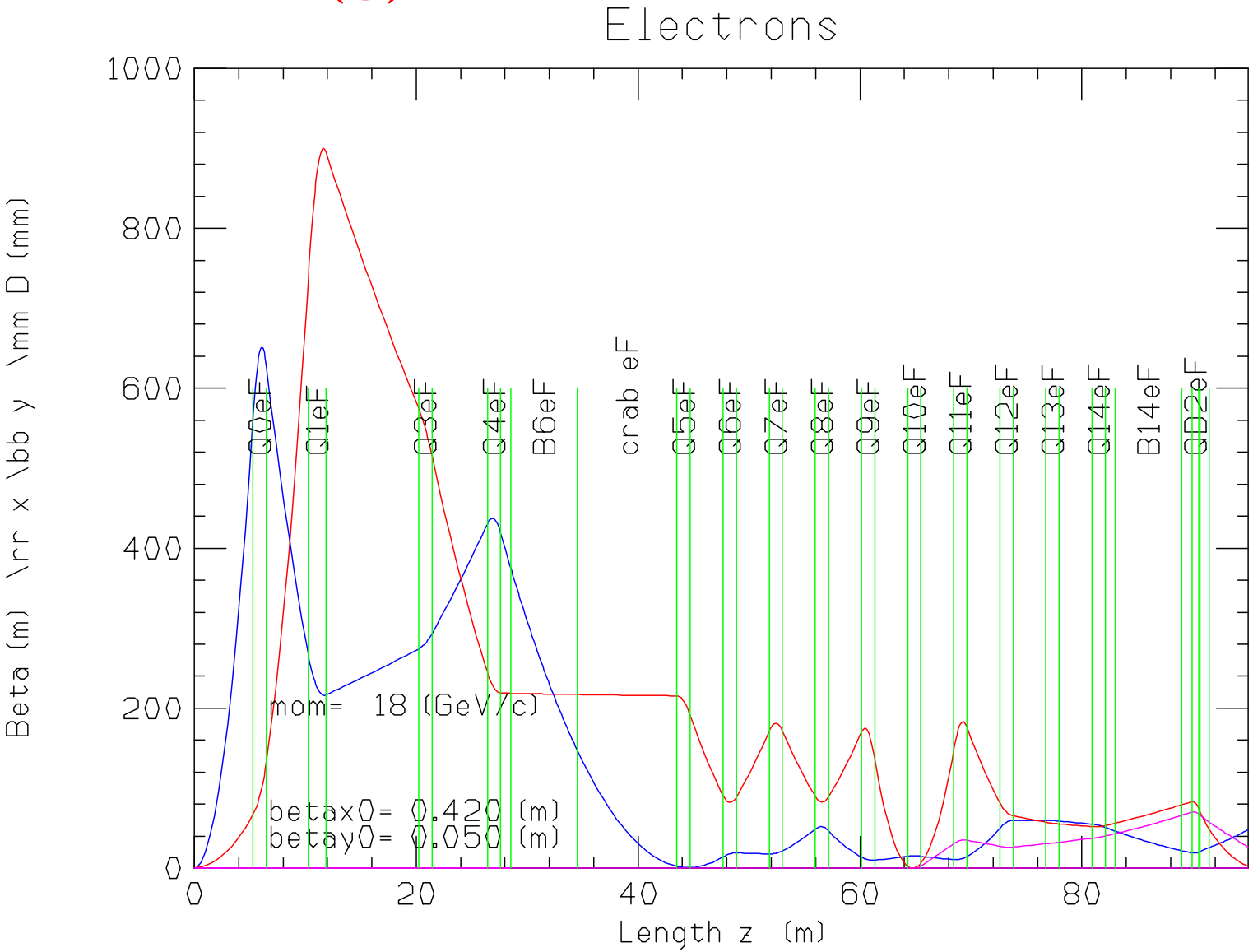
B6 ef = 0.159 T depolarization 64% less than (g)

Long distance from B14 makes SR much easier

Discusion

- There remains some slight interference between the e transport and the hadron crab
- This could be fixed by moving both b6 and the crab to the right
- But this will increase the bend fields and further raise the phase advance to the crab
- I suggest we look carefully at the (g) interference before a case with them moved

Betas for (g)



beta x flat over crab

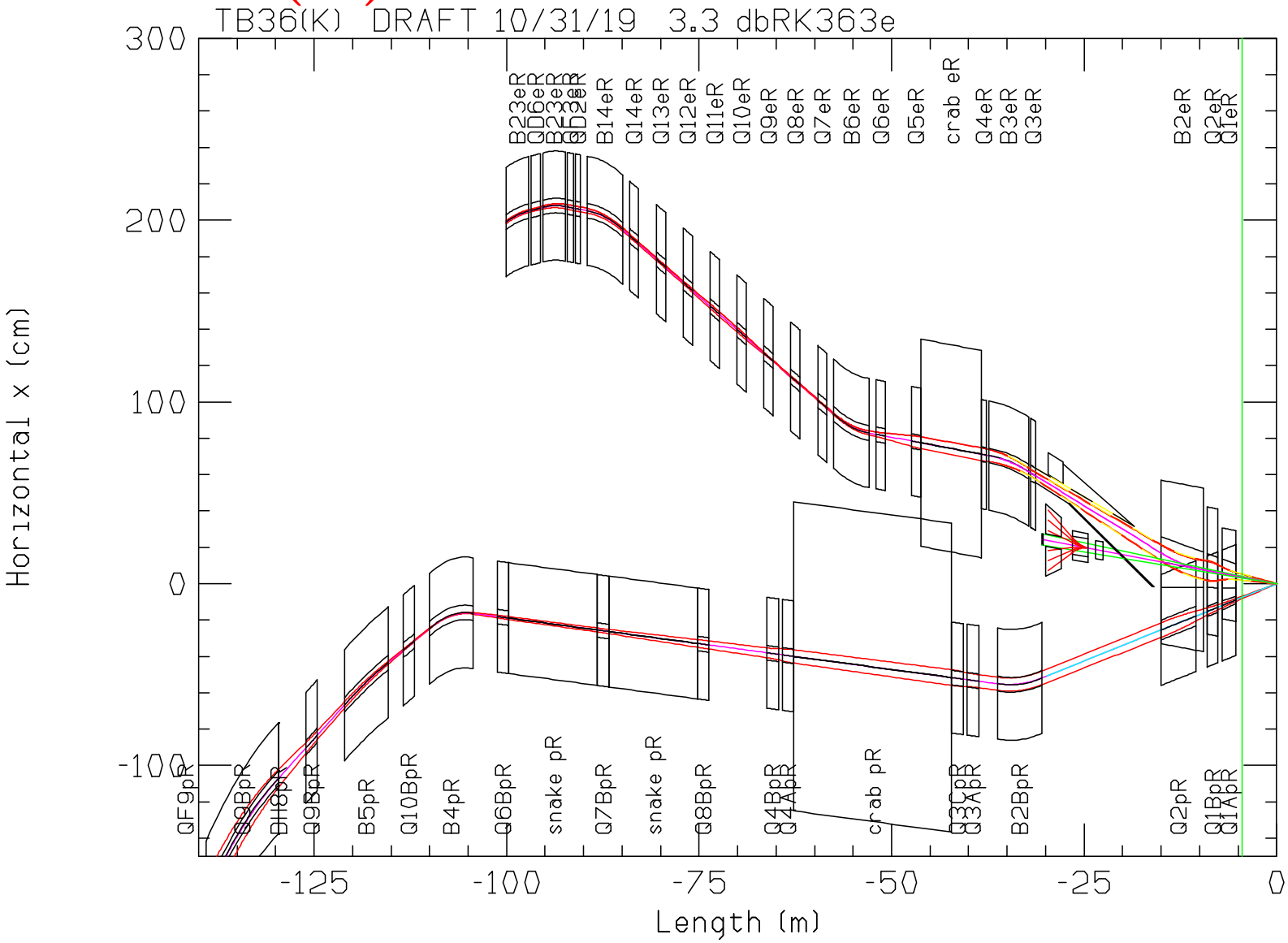
Good transmission but not yet matched

Parameters for (g)

```
# ------------------------------------
# TB37(M)  DRAFT 10/31/19  zbFM363g Electron Forward  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]
  Q0eF    5.900  -0.1475  0.028  0.028   1.20   25.0   0.000   -13.531    -0.379
  Q1eF   11.065  -0.2766  0.070  0.070   1.61   25.0   0.000     6.200     0.434
  Q3eF   20.820  -0.5205  0.060  0.060   1.20   25.0   0.000     1.500     0.090
  Q4eF   27.020  -0.6755  0.040  0.040   1.20   25.0   0.000    -4.650    -0.186
  B6eF   31.520  -0.7638  0.040  0.040   6.00   33.1  -0.158     0.000     0.000
  Q5eF   44.102  -0.9036  0.040  0.040   1.20   40.8   0.000     5.000     0.200
  Q6eF   48.259  -0.9418  0.040  0.040   1.20   40.8   0.000   -14.528    -0.581
  Q7eF   52.416  -0.9799  0.040  0.040   1.20   40.8   0.000     9.252     0.370
  Q8eF   56.573  -1.0181  0.040  0.040   1.20   40.8   0.000   -13.205    -0.528
  Q9eF   60.730  -1.0563  0.040  0.040   1.20   40.8   0.000    18.172     0.727
  Q10eF  64.888  -1.0945  0.040  0.040   1.20   40.8   0.000    -6.493    -0.260
  Q11eF  69.045  -1.1327  0.040  0.040   1.20   40.8   0.000    17.824     0.713
  Q12eF  73.202  -1.1709  0.040  0.040   1.20   40.8   0.000    -7.441    -0.298
  Q13eF  77.359  -1.2091  0.040  0.040   1.20   40.8   0.000    -0.587    -0.023
  Q14eF  81.516  -1.2473  0.040  0.040   1.20   40.8   0.000    -2.024    -0.081
  B14eF  86.016  -1.3129  0.040  0.040   6.00   32.7   0.158     0.000     0.000
  QD2eF  90.216  -1.3937  0.040  0.040   0.60   25.0   0.000    23.109     0.924
  QF3eF  91.066  -1.4150  0.040  0.040   0.80   25.0   0.000    -2.800    -0.112
```

REAR

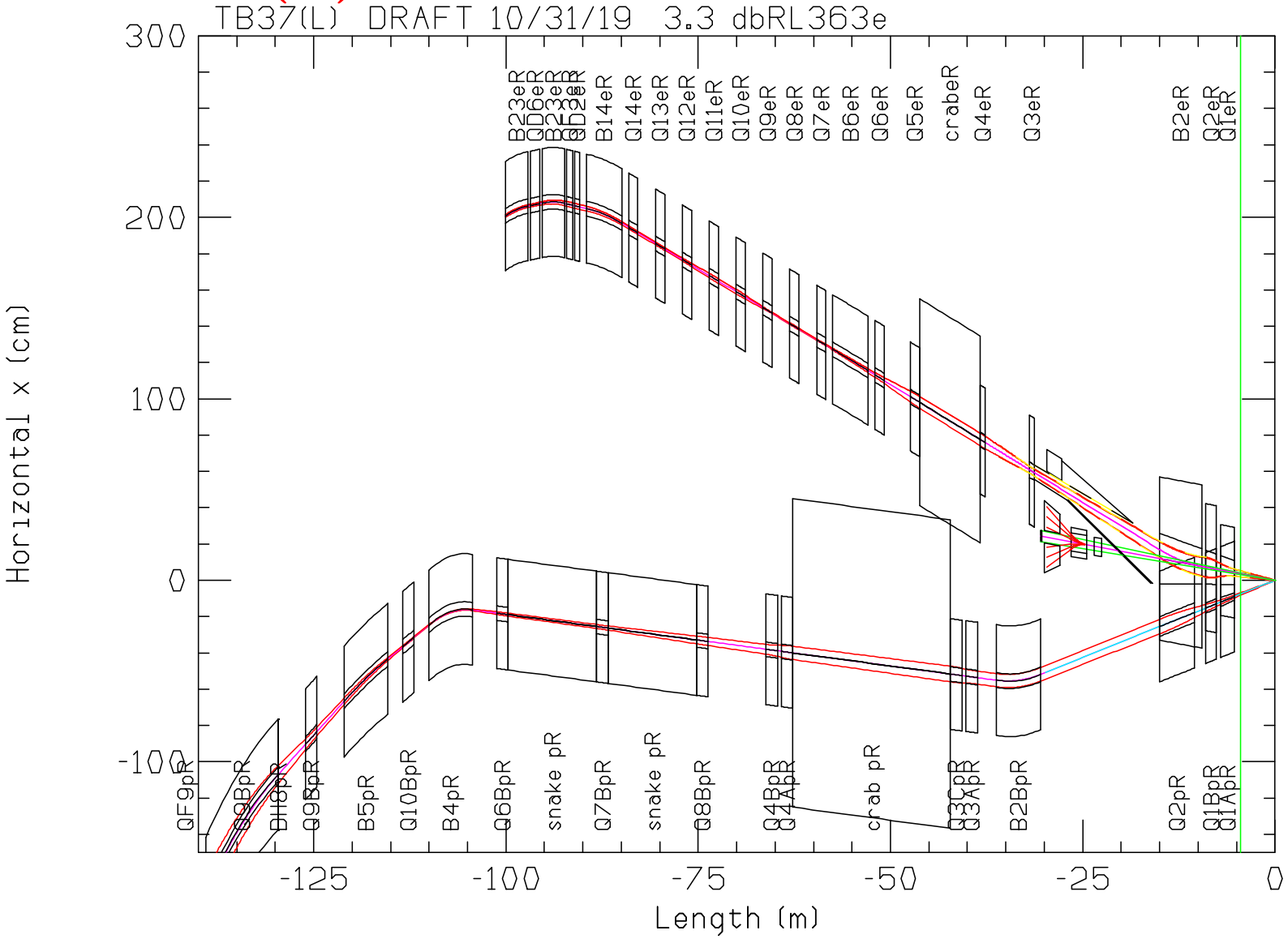
baseline (K)



Interference p amd e crabs and high fields

Bend immediately before crab will give disasterous SR

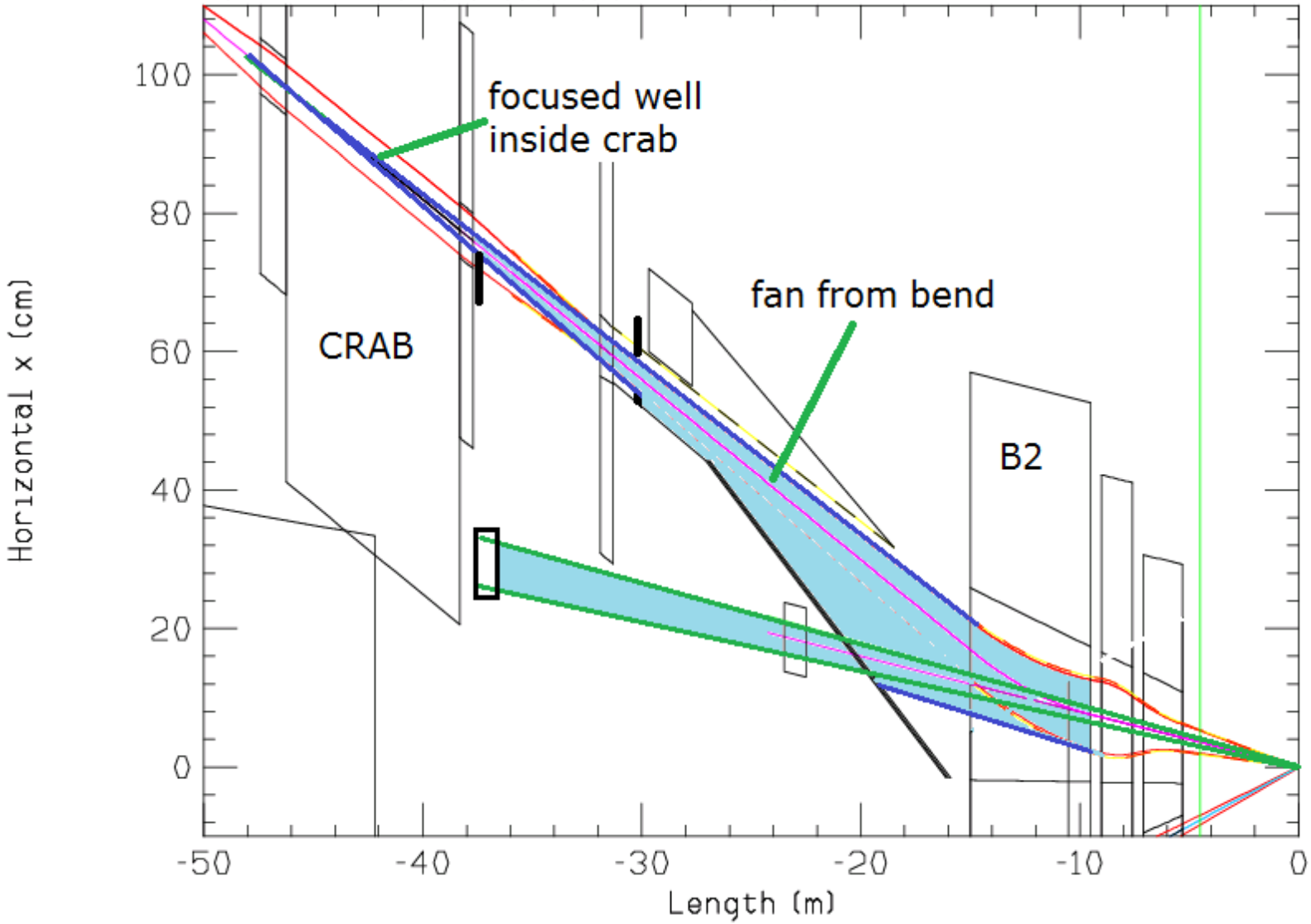
Version (L)



No interference

Lower fields

SR in version (L)



Masks shown give probably give excessive protection

Impedance problems will be less with more open masks

Discussion

- For version (L) I have 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
- This can be removed if B2 is reduced but this not only messes with the physics simulations, but reduces the beam separation at the tagger.
- This needs further study

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

Parameters for (L)

```
# ----------------------------------
# TB37(L)  DRAFT 10/31/19  zbRL363e 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  -0.196     0.000     0.000
  Q3eR  -31.600   1.1383  0.040  0.045   0.60   43.0   0.000   -23.200    -1.032
  Q4eR  -38.000   1.4136  0.040  0.040   0.60   43.0   0.000     8.900     0.356
  Q5eR  -46.830   1.7932  0.040  0.040   1.20   43.0   0.000     5.900     0.236
  Q6eR  -51.395   1.9895  0.040  0.040   1.20   43.0   0.000    -8.800    -0.352
  B6eR  -55.195   2.1521  0.040  0.040   4.60   42.6   0.009     0.000     0.000
  Q7eR  -58.995   2.3136  0.040  0.040   1.20   42.3   0.000     1.300     0.052
  Q8eR  -62.489   2.4614  0.040  0.040   1.20   42.3   0.000    29.700     1.188
  Q9eR  -65.983   2.6092  0.040  0.040   1.20   42.3   0.000   -16.950    -0.678
  Q10eR -69.476   2.7569  0.040  0.040   1.20   42.3   0.000    10.450     0.418
  Q11eR -72.970   2.9047  0.040  0.040   1.20   42.3   0.000     6.450     0.258
  Q12eR -76.464   3.0525  0.040  0.040   1.20   42.3   0.000    -5.800    -0.232
  Q13eR -79.958   3.2002  0.040  0.040   1.20   42.3   0.000    -1.500    -0.060
  Q14eR -83.451   3.3479  0.040  0.040   1.20   42.3   0.000    -1.800    -0.072
  B14eR -87.251   3.4908  0.040  0.040   4.60   34.5   0.198     0.000     0.000
  QD2eR -90.752   3.6034  0.040  0.040   0.60   27.1   0.000     8.000     0.320
```