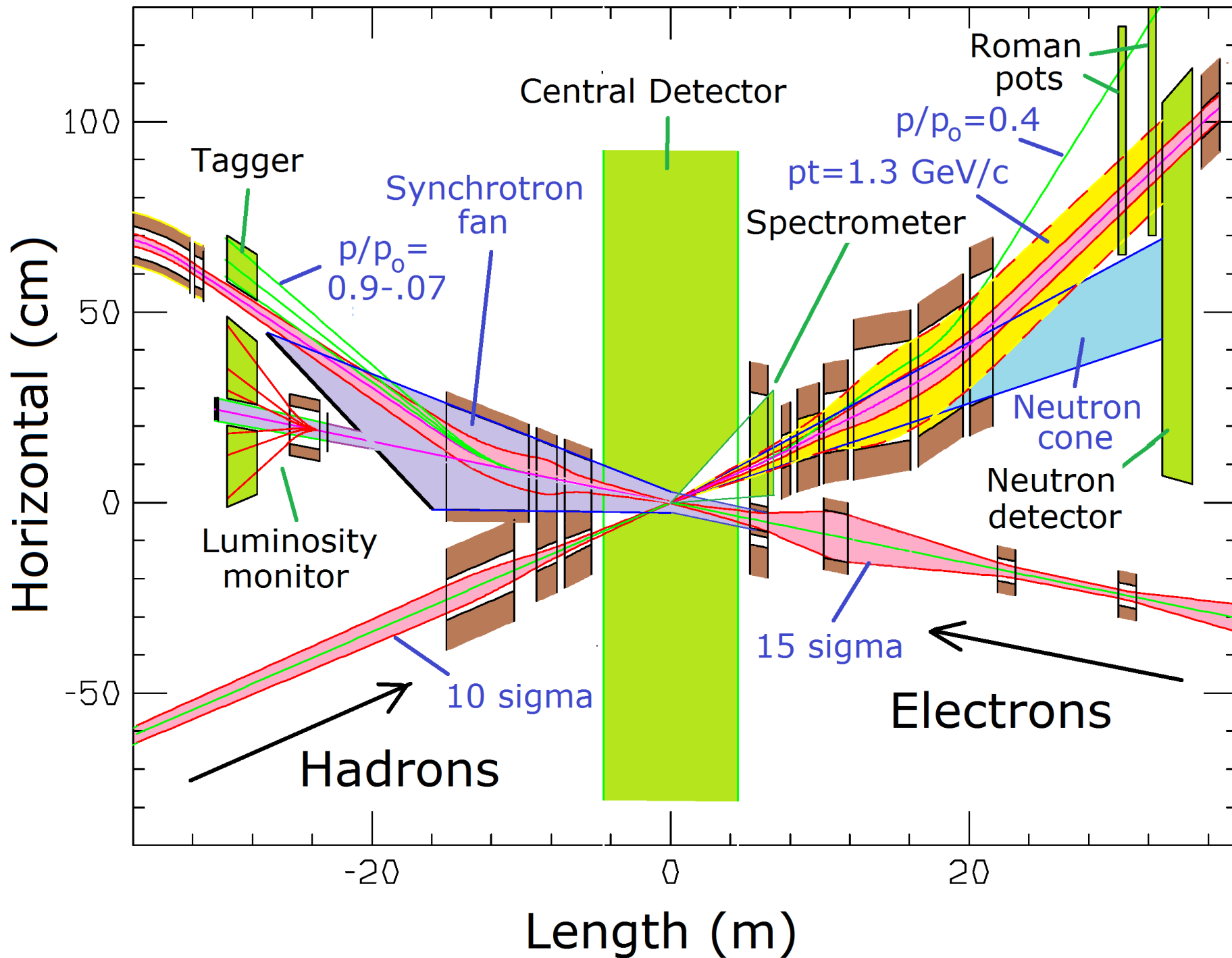


IR Version 6.4

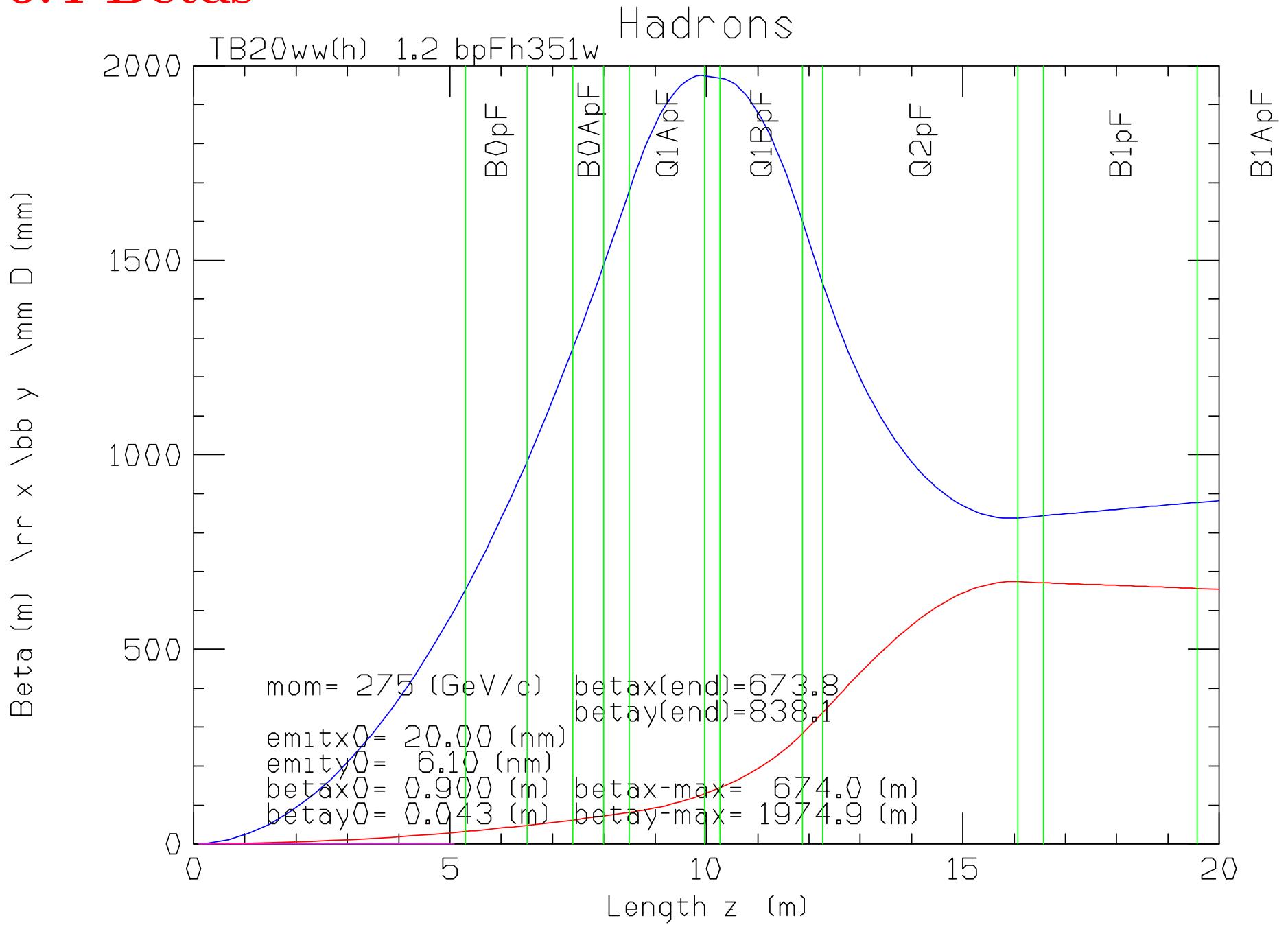
5/10/19

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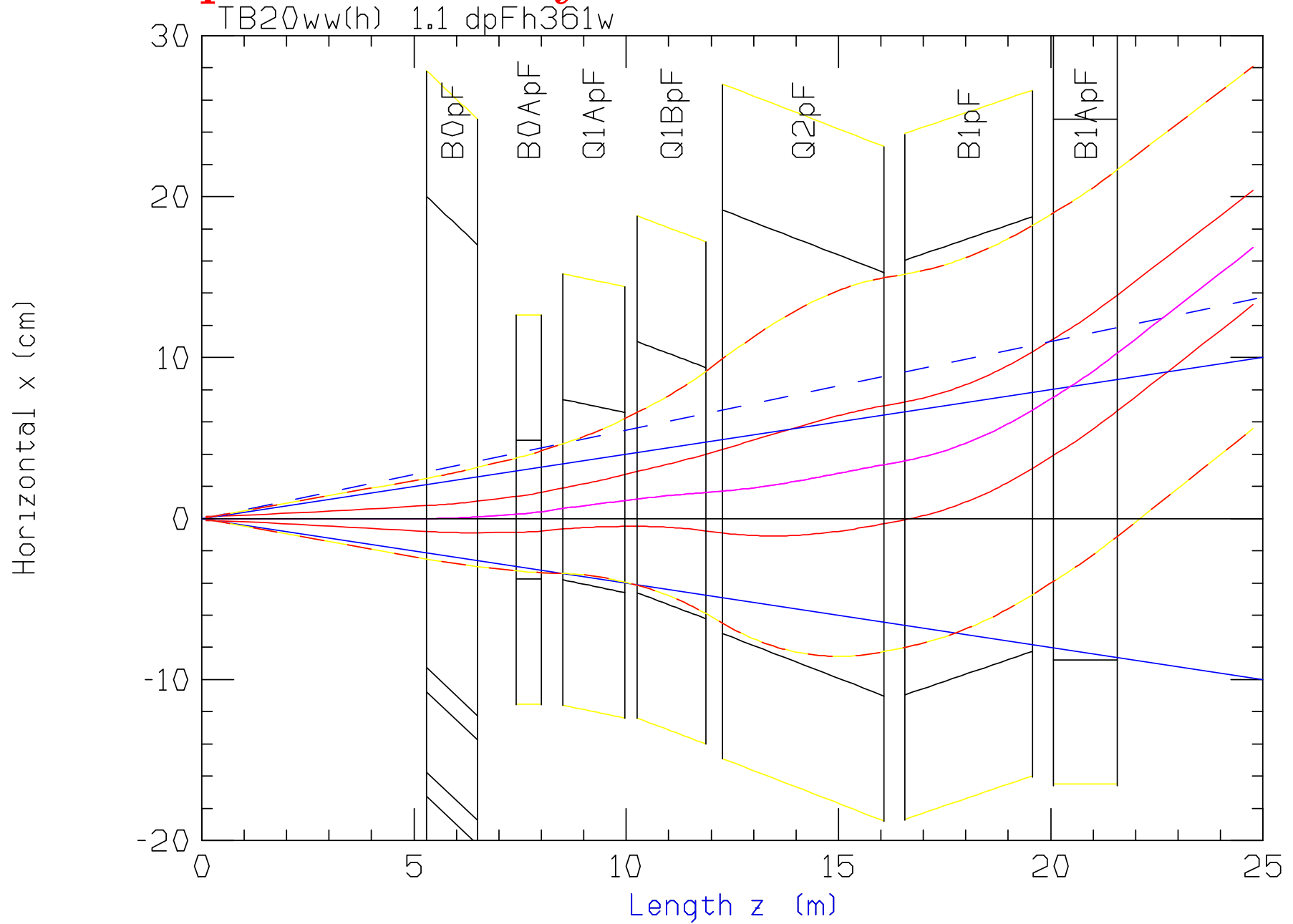
1. Slight changes in locations and apertures of Proton Forward magnets
 - ≈ 2 mm clearance in my program for all magnets
 - All $pt=1.3$ GeV/c pass through BMAD representation of this version
 - But $pt>1.3$ GeV/c pass in some cases indicating that small changes could reduce some apertures
2. New layout Figure
3. Fields and beams for 100 and 41 GeV/c



6.4 Betas



Detail p Forward layout



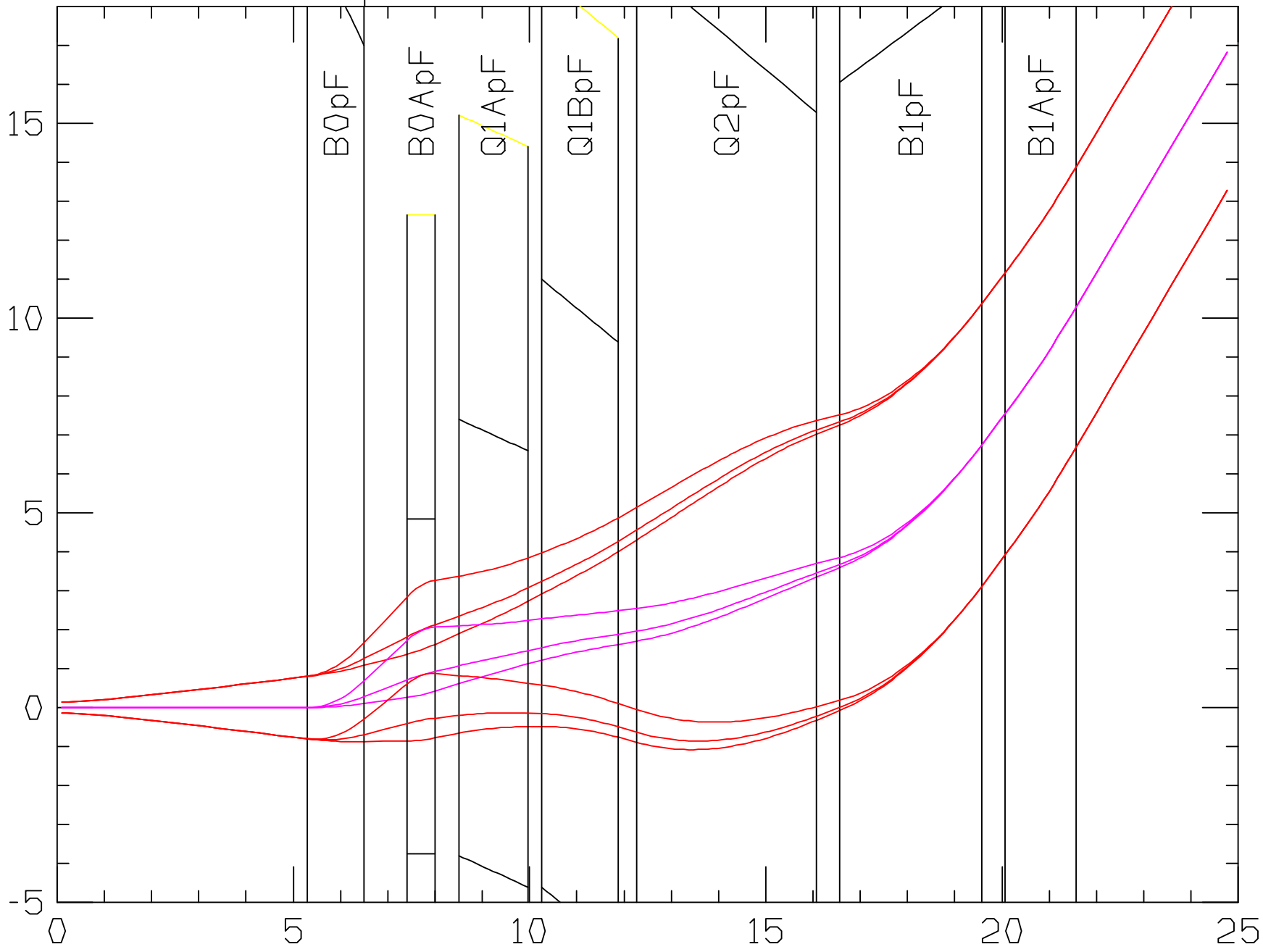
Runs at 100 and 41 GeV/c

- Using my program (not yet checked with BMAD)
- Field in B0pF (Forward Spectrometer) = 1.3 T at all energies
- For other energies:
Fields adjusted in B0Apf and B1pF to get central location and angle of tracks in B1ApF

Momentum (GeV/c)	275	100	41
magnet	B(T)	B(T)	B(T)
B0pF	-1.3	-1.3	-1.3
B0ApF	-3.300	+ 1.014	2.467
B1pF	-3.405	-1.298	-0.588

TB20ww(h) .8 dpFh351w

Horizontal x (cm)



6.4 Proton Forward data for 275 GeV/c

DATA FOR 275 GeV/c

```

#
# -----
# TB20ww(h)  zpFh361w Hadron forward  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   0.0430   20.0000  6.1000   25       0        275
#
# name      center_z center_x rad1  rad2  length  angle  B      grad  ap x grad  x1  x2  cc1  cc2
#           [m]      [m]     {m}  [m]   [m]     [mrad] [T]    [T/m] [T]    [T]    [m]  [m]  [m]  [m]
# B0pF      5.900   -0.0150 0.200 0.200  1.20   -25.0  -1.30  0.000  0.000  0.0000 -0.0300 0.1325 0.1325
# B0ApF     7.700   0.0055 0.043 0.043  0.60    0.0   -3.30  0.000  0.000  0.0055 0.0055 0.1905 0.2055
# Q1ApF     9.230   0.0140 0.056 0.056  1.46   -5.5   0.00  -72.608 -4.066  0.0180 0.0100 0.2305 0.2590
# Q1BpF    11.065   0.0238 0.078 0.078  1.61  -10.0  0.00  -66.180 -5.162  0.0319 0.0158 0.2884 0.3126
# Q2pF    14.170   0.0407 0.131 0.131  3.80  -10.2  0.00  40.737  5.357  0.0601 0.0213 0.3668 0.4231
# B1pF    18.070   0.0390 0.135 0.135  3.00    9.0  -3.40  0.000  0.000  0.0255 0.0525 0.4397 0.5418
# B1ApF    20.820   0.0800 0.168 0.168  1.50    0.0  -2.70  0.000  0.000  0.0800 0.0800 0.5817 0.6192
# B2ApF    36.170   0.4013 0.040 0.040  1.20   20.0  3.00  0.000  0.000  0.3893 0.4133 1.2786 1.3326
# B2bpF    47.370   0.5868 0.040 0.040  1.20   16.5  0.00  0.000  0.000  0.5769 0.5967 1.7461 1.7960
#
# name      center_z  x(beam)  theta  Bdist1  Bdist2  alphax  betax  alphay  betay
#           [m]      [m]      (mrad) (T)     (T)      [m]    [m]    [m]     [m]
# B0pF      B0    5.900   0.0003  0.851   0.000   0.000  -6.556  39.578 -137.209 809.577
# B0ApF     B0A   7.700   0.0032  2.782   0.000   0.000  -8.556  66.778 -179.070 1378.878
# Q1ApF     Q1A   9.230   0.0088  3.372   0.615   0.143  -15.914 99.414 -103.258 1903.674
# Q1BpF     Q1B  11.065   0.0144  2.415   0.960   0.296  -41.827 198.630 118.514 1866.285
# Q2pF      Q2   14.170   0.0239  4.712  -1.234  -0.095 -49.257 579.555 71.180 956.800
# B1pF      B1   18.070   0.0475 10.480  0.000   0.000  2.445  664.008 -5.681 860.692
# B1ApF     B1A  20.820   0.0883 18.258  0.000   0.000  2.416  650.638 -5.788 892.231
# B2ApF     B2A  36.170   0.4010 18.501  0.000   0.000  2.255  578.933 -6.381 1079.019
# B2bpF     B2b  47.370   0.5868 16.537  0.000   0.000  2.137  529.739 -6.814 1226.803
#
# -----
#

```

6.4 Proton Forward DATA for lower p energies

```
#
DATA for p=100 GeV/c
#
# name      center_z center_x rad1  rad2  length  angle      B      grad  ap x grad  x1  x2  cc1  cc2
#           [m]      [m]    {m}  [m]   [m]    [mrad]    [T]    [T/m] [T]  [T]  [m]  [m]  [m]  [m]
B0pF      5.900  -0.0150  0.200  0.200  1.20  -25.0  -3.57  0.000  0.000  0.000  0.0000 -0.0300  0.1325  0.1325
B0ApF     7.700   0.0055  0.043  0.043  0.60   0.0    2.79   0.000  0.000  0.000  0.0055  0.0055  0.1905  0.2055
Q1ApF     9.230   0.0140  0.056  0.056  1.46  -5.5    0.00  -72.608 -4.066  0.0180  0.0100  0.2305  0.2590
Q1BpF    11.065   0.0238  0.078  0.078  1.61 -10.0   0.00  -66.180 -5.162  0.0319  0.0158  0.2884  0.3126
Q2pF    14.170   0.0407  0.131  0.131  3.80 -10.2   0.00  40.737  5.357  0.0601  0.0213  0.3668  0.4231
B1pF    18.070   0.0390  0.135  0.135  3.00   9.0   -3.57  0.000  0.000  0.0255  0.0525  0.4397  0.5418
B1ApF    20.820   0.0800  0.168  0.168  1.50   0.0   -2.70  0.000  0.000  0.0800  0.0800  0.5817  0.6192
#
```

Data for 41 GeV/c

```
#
# name      center_z center_x rad1  rad2  length  angle      B      grad  ap x grad  x1  x2  cc1  cc2
#           [m]      [m]    {m}  [m]   [m]    [mrad]    [T]    [T/m] [T]  [T]  [m]  [m]  [m]  [m]
B0pF      5.900  -0.0150  0.200  0.200  1.20  -25.0  -8.71  0.000  0.000  0.000  0.0000 -0.0300  0.1325  0.1325
B0ApF     7.700   0.0055  0.043  0.043  0.60   0.0   16.53  0.000  0.000  0.0055  0.0055  0.1905  0.2055
Q1ApF     9.230   0.0140  0.056  0.056  1.46  -5.5    0.00  -72.608 -4.066  0.0180  0.0100  0.2305  0.2590
Q1BpF    11.065   0.0238  0.078  0.078  1.61 -10.0   0.00  -66.180 -5.162  0.0319  0.0158  0.2884  0.3126
Q2pF    14.170   0.0407  0.131  0.131  3.80 -10.2   0.00  40.737  5.357  0.0601  0.0213  0.3668  0.4231
B1pF    18.070   0.0390  0.135  0.135  3.00   9.0   -3.94  0.000  0.000  0.0255  0.0525  0.4397  0.5418
B1ApF    20.820   0.0800  0.168  0.168  1.50   0.0   -2.70  0.000  0.000  0.0800  0.0800  0.5817  0.6192
#
```