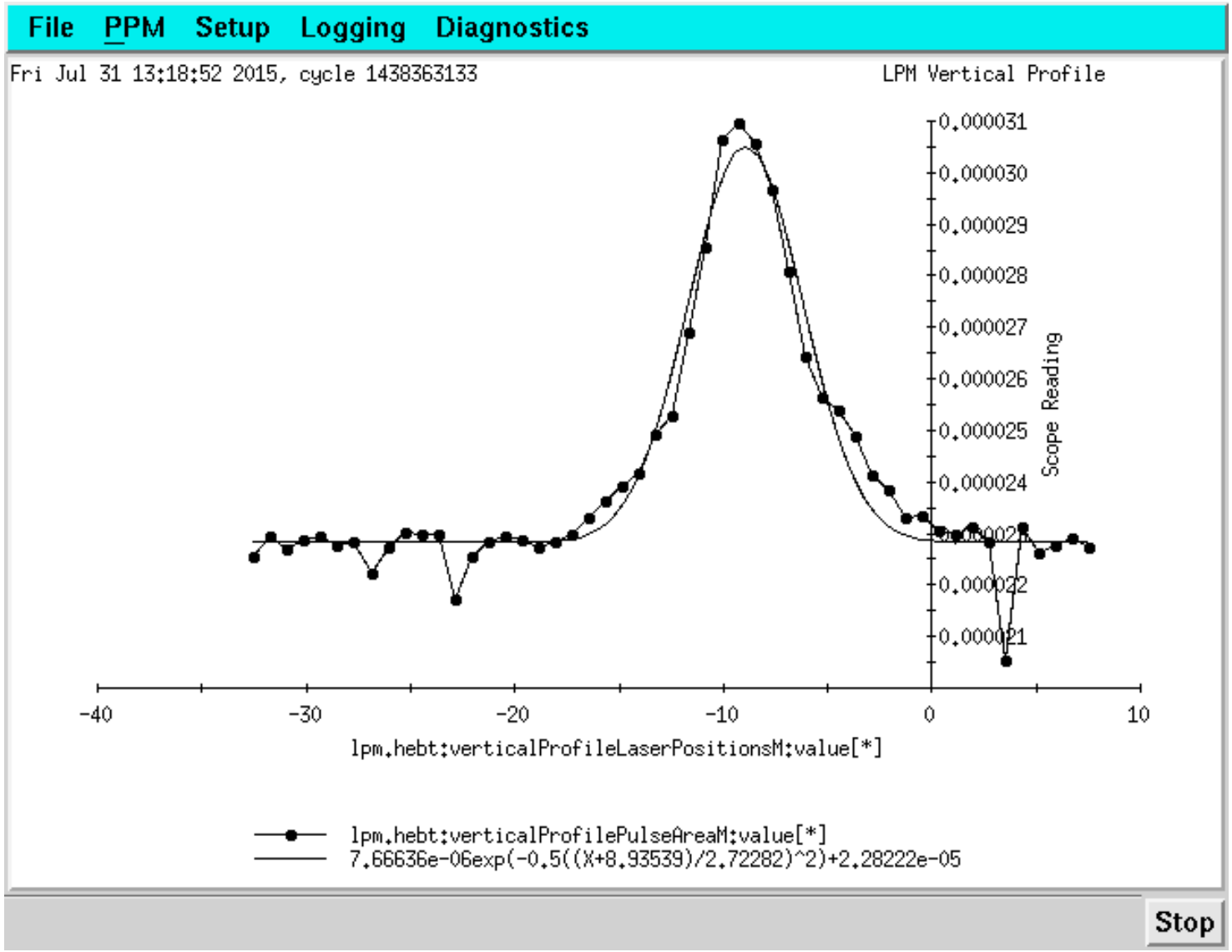
Answers

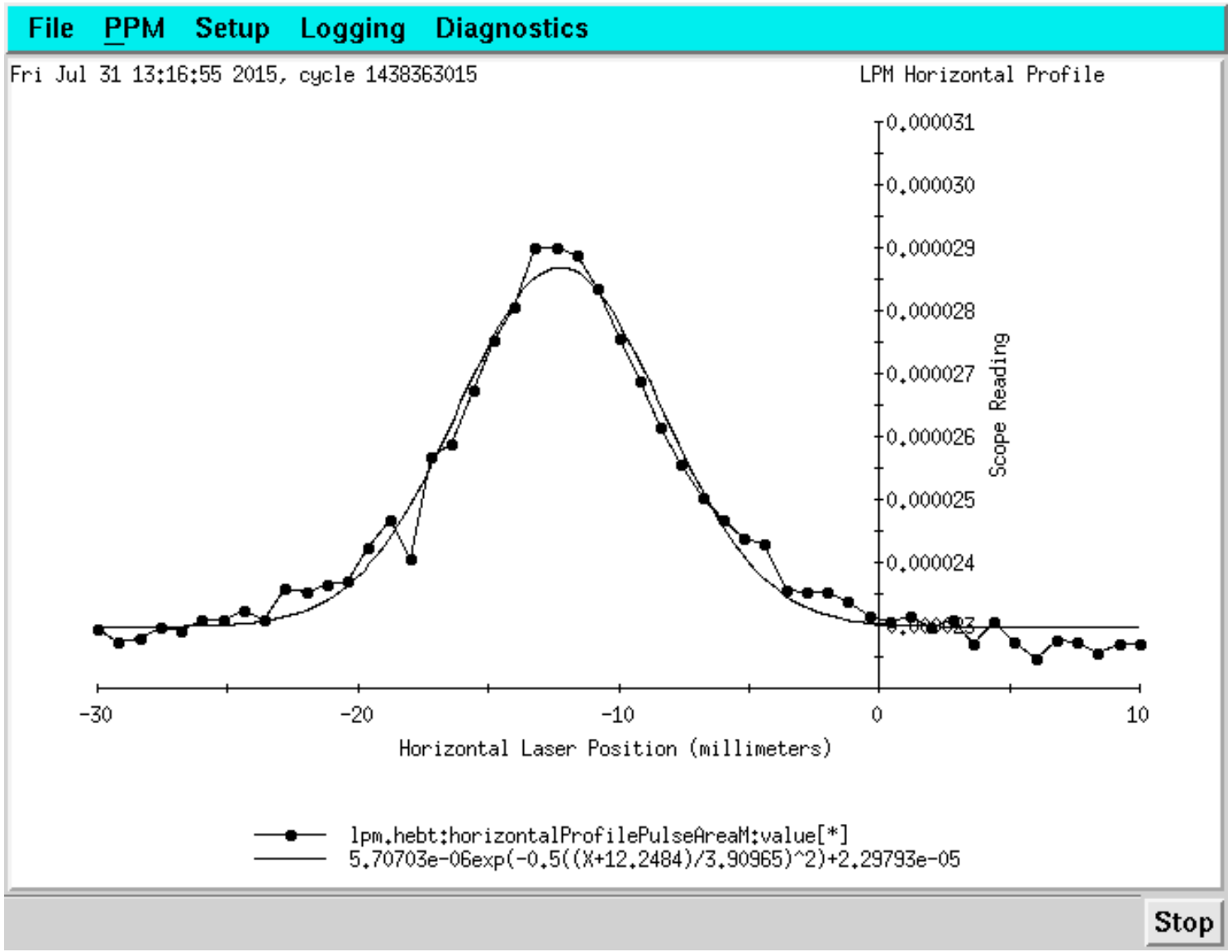
Questions

- 1 A typical beam profile from the end of Tank 9 to Blip for 117 MeV and 200 MeV.
- 2. A layout with identified elements
- 3. A description of the losses associated with the PD19 the y-dipole (I think).
- 4. A description of the loss last year and the anticipated size of the loss.
- 5. A description of the sensitivity of the loss monitor system to detect beam losses.
-

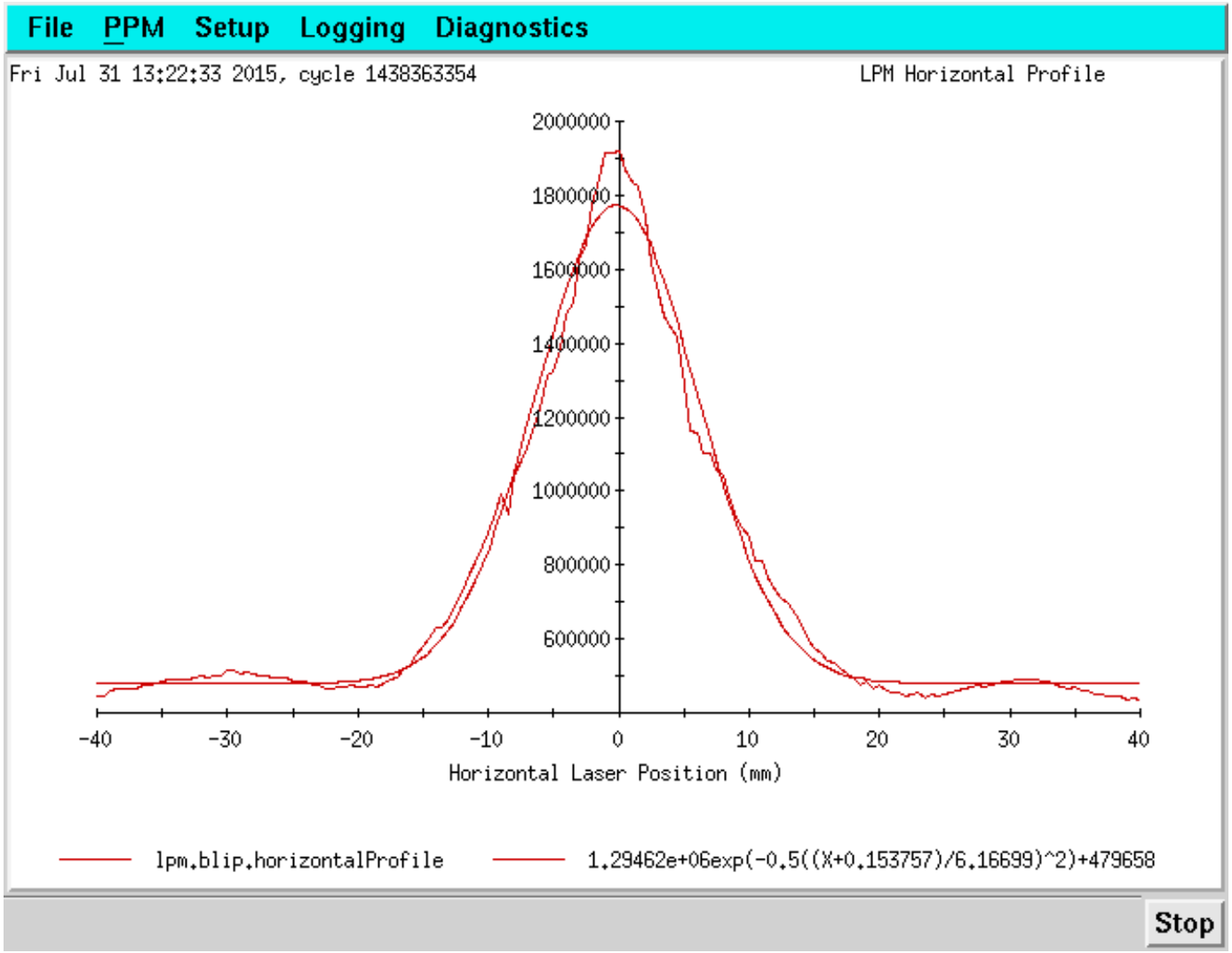
TANK 9 Vertical 117 MeV



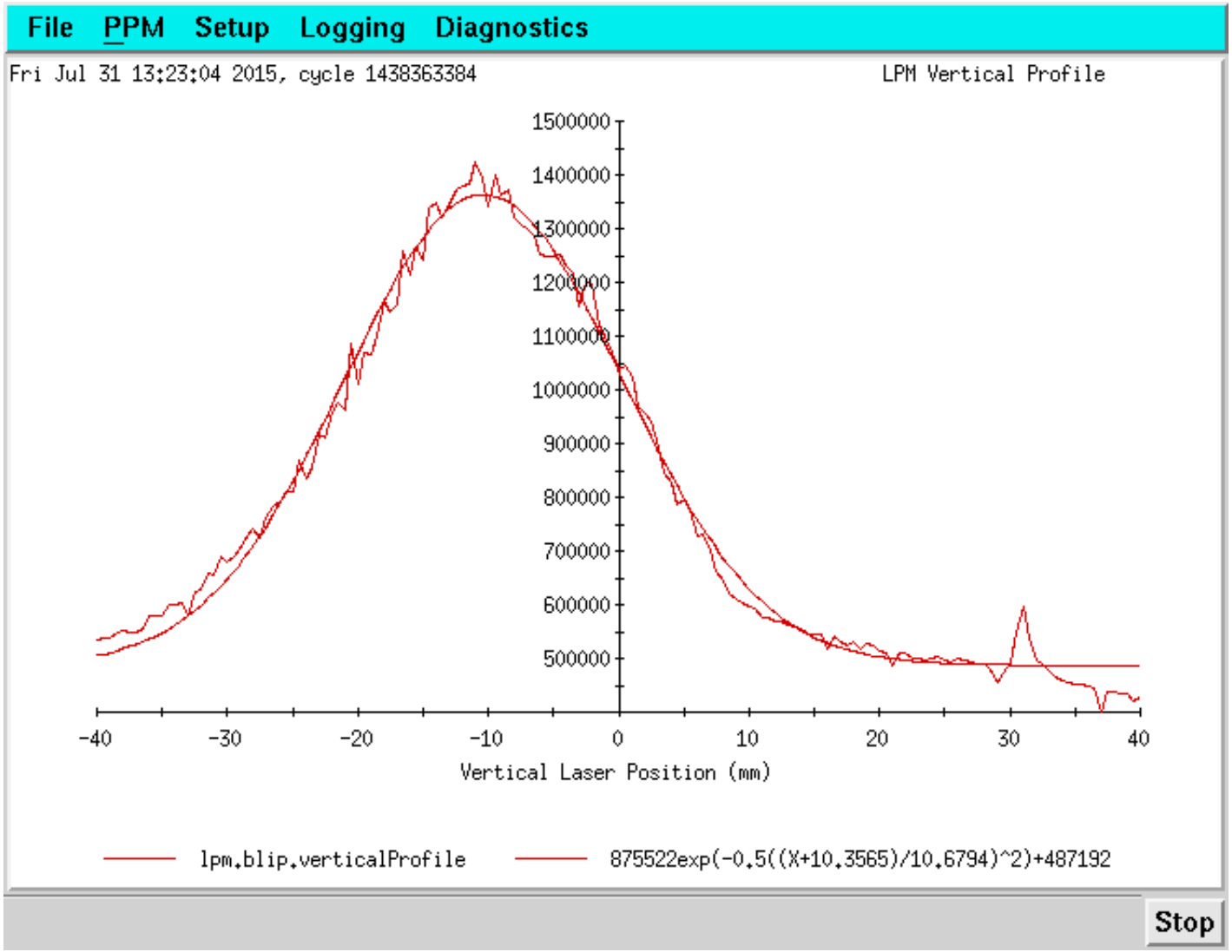
Tank 9 H profile 117 MeV



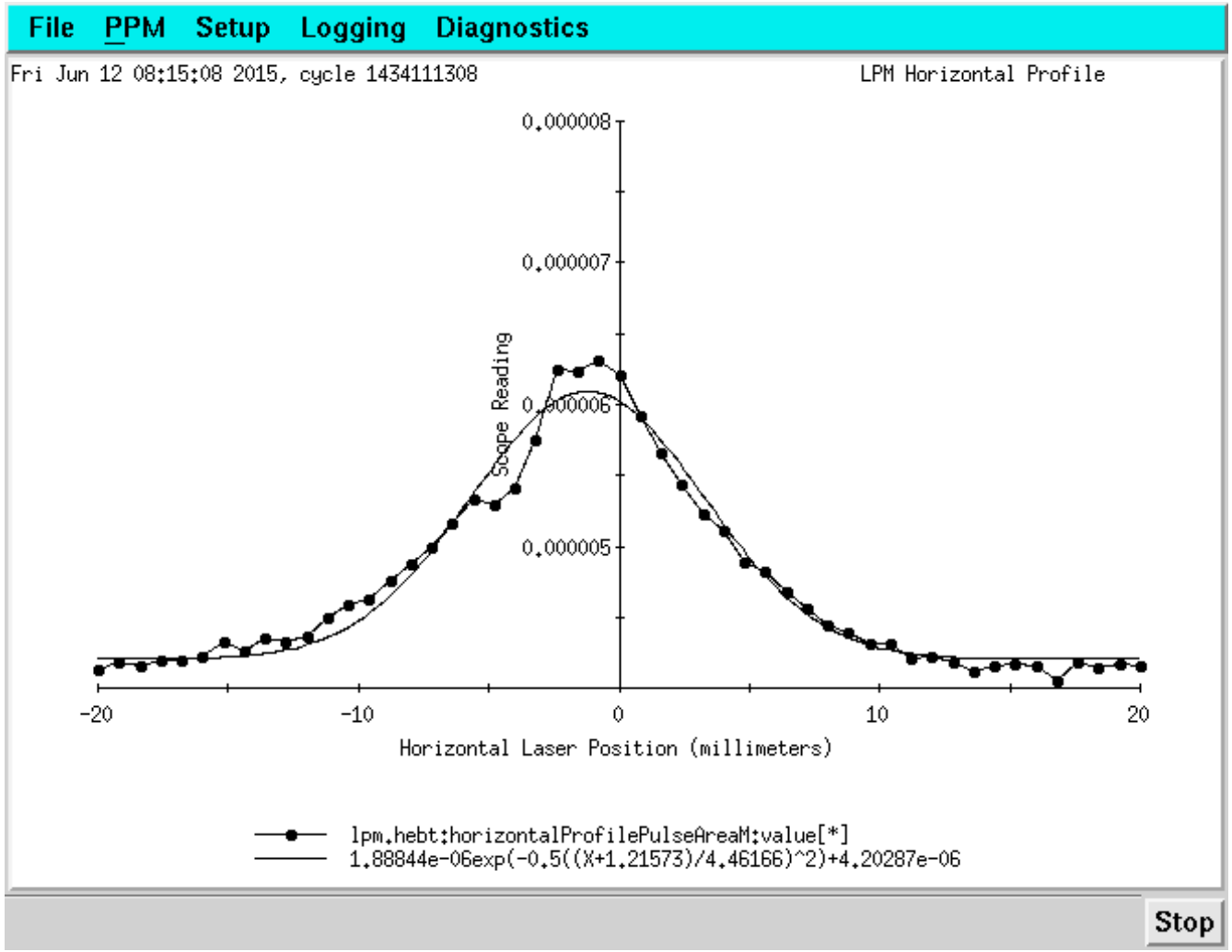
BLIP H (117 MeV)



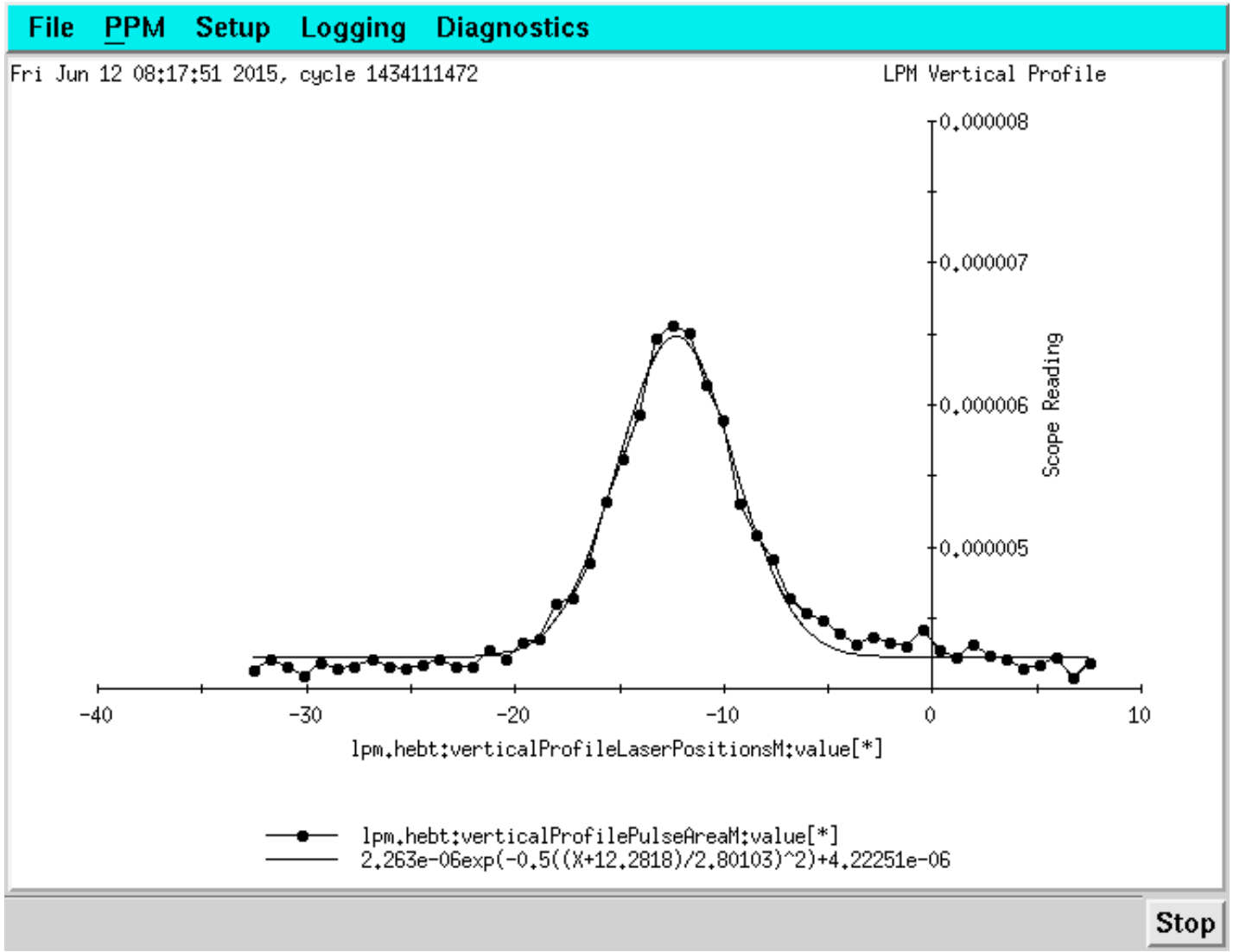
BLIP Vertical (117 M3V)



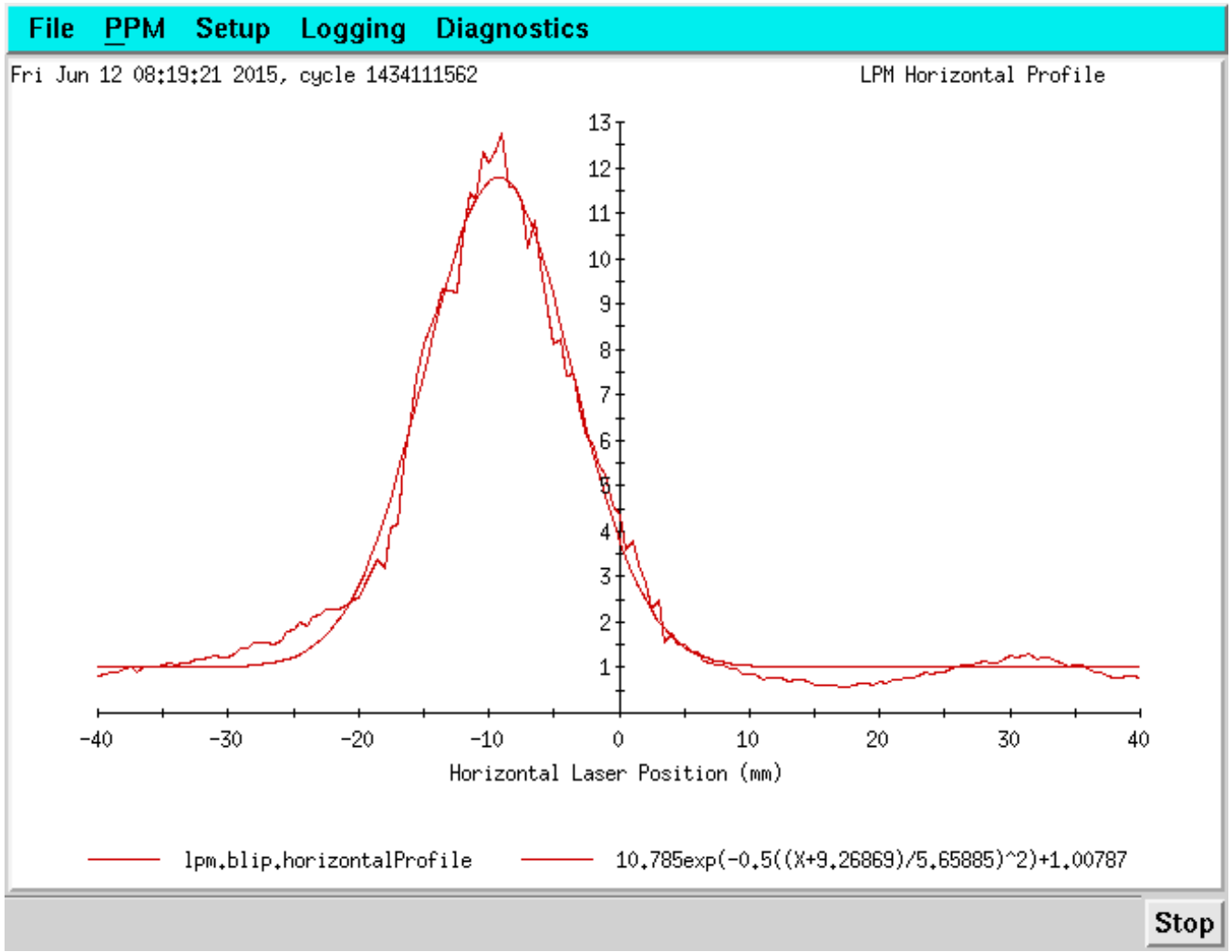
TK9 H (200 MeV)


File PPM Setup Logging Diagnostics
Fri Jun 12 08:15:08 2015, cycle 1434111308
LPM Horizontal Profile
0.000008
0.000007
0.000006
0.000005
Scope Reading
-20
-10
0
10
20
Horizontal Laser Position (millimeters)
lpm.hebt:horizontalProfilePulseAreaM:value[*]
1.88844e-06exp(-0.5((X+1.21573)/4.46166)^2)+4.20287e-06
Stop

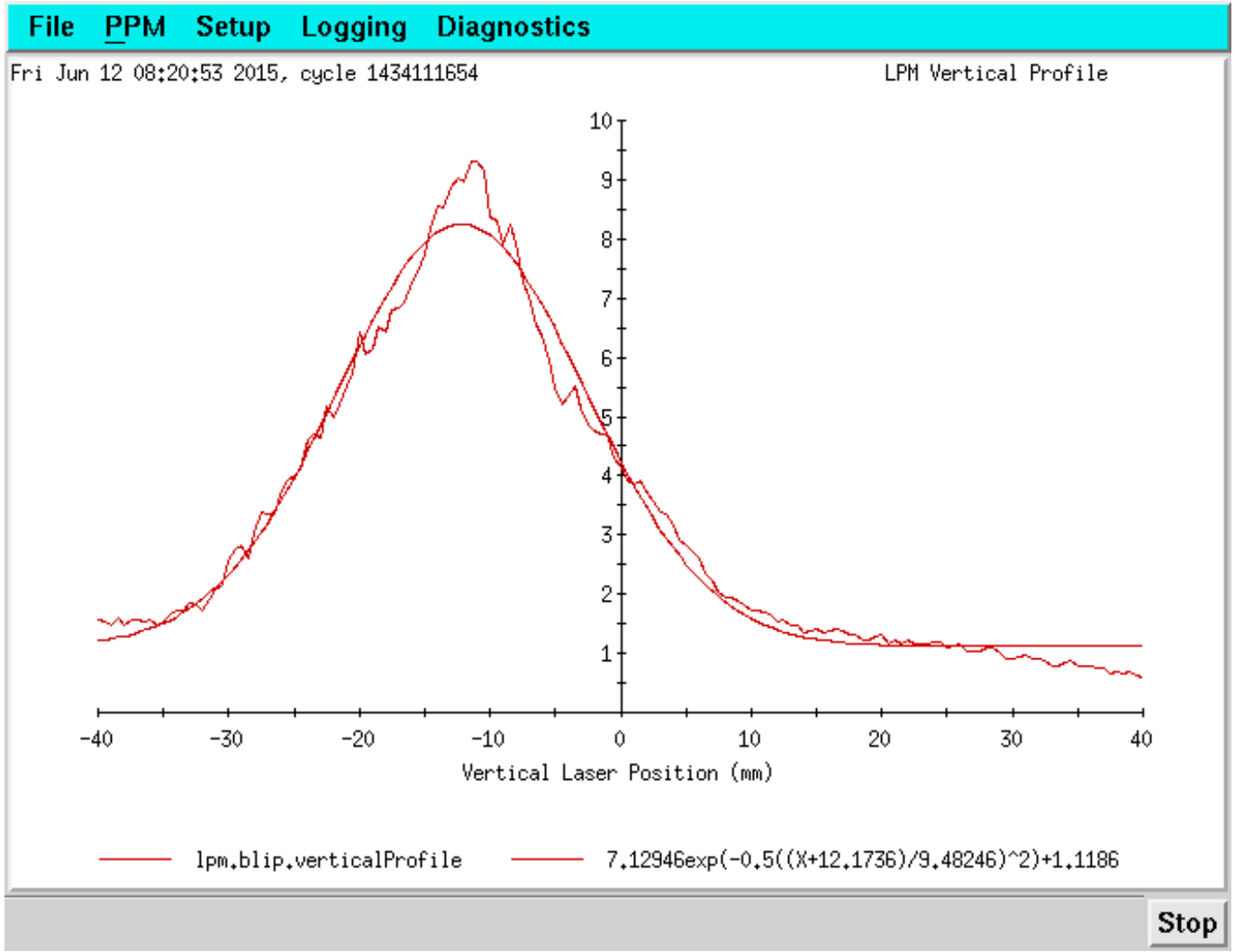
TK9 V (200 MeV)


File PPM Setup Logging Diagnostics
Fri Jun 12 08:17:51 2015, cycle 1434111472
LPM Vertical Profile
0.000008
0.000007
0.000006
0.000005
Scope Reading
-40
-30
-20
-10
0
10
lpm.hebt:verticalProfileLaserPositionsM:value[*]
lpm.hebt:verticalProfilePulseAreaM:value[*]
2.263e-06exp(-0.5((X+12.2818)/2.80103)^2)+4.22251e-06
Stop

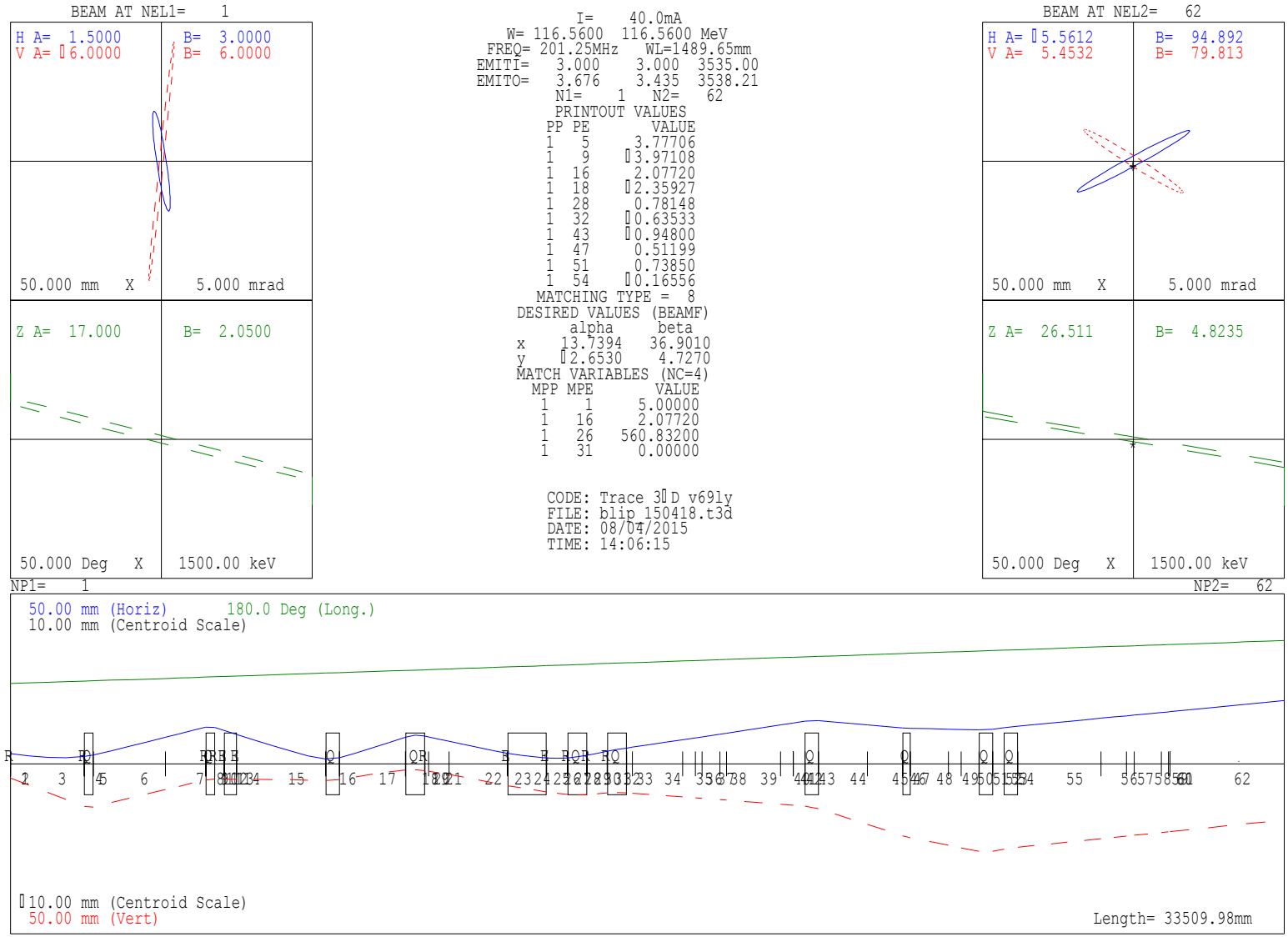
BLIP H (200 MeV)



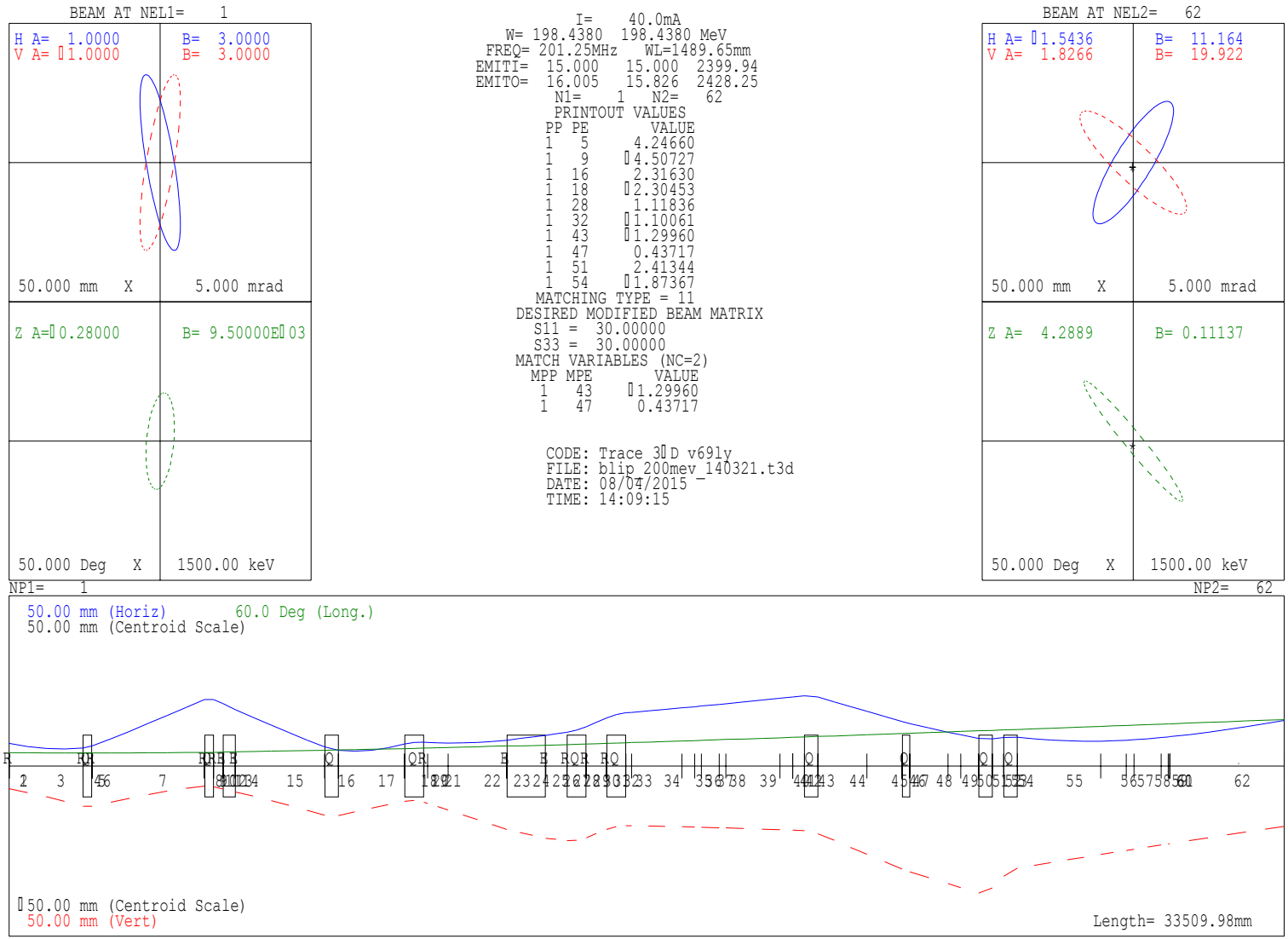
BLIP V (200 MeV)

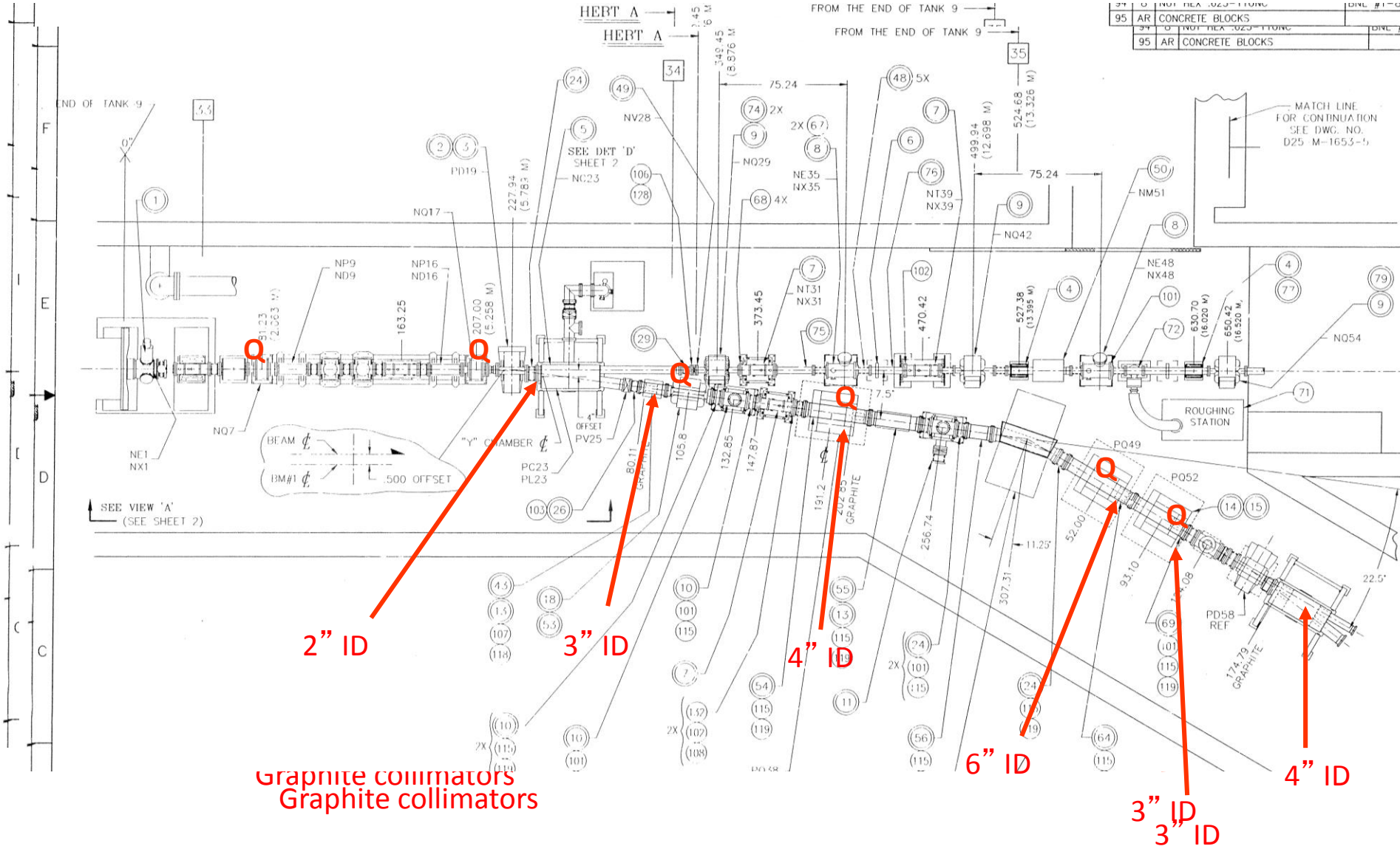


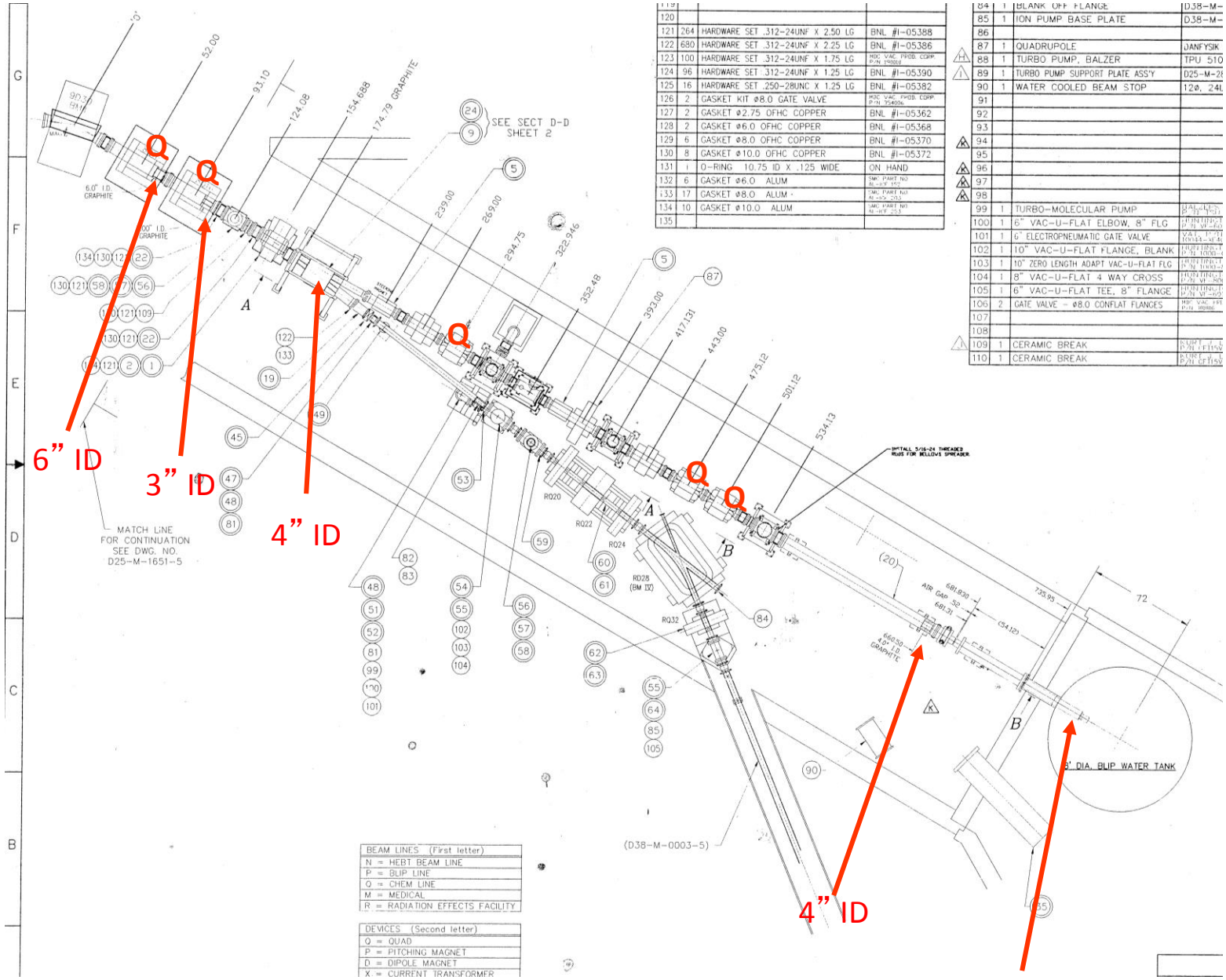
Beam Envelop 117 MeV



BLIP Beam envelop 200 MeV



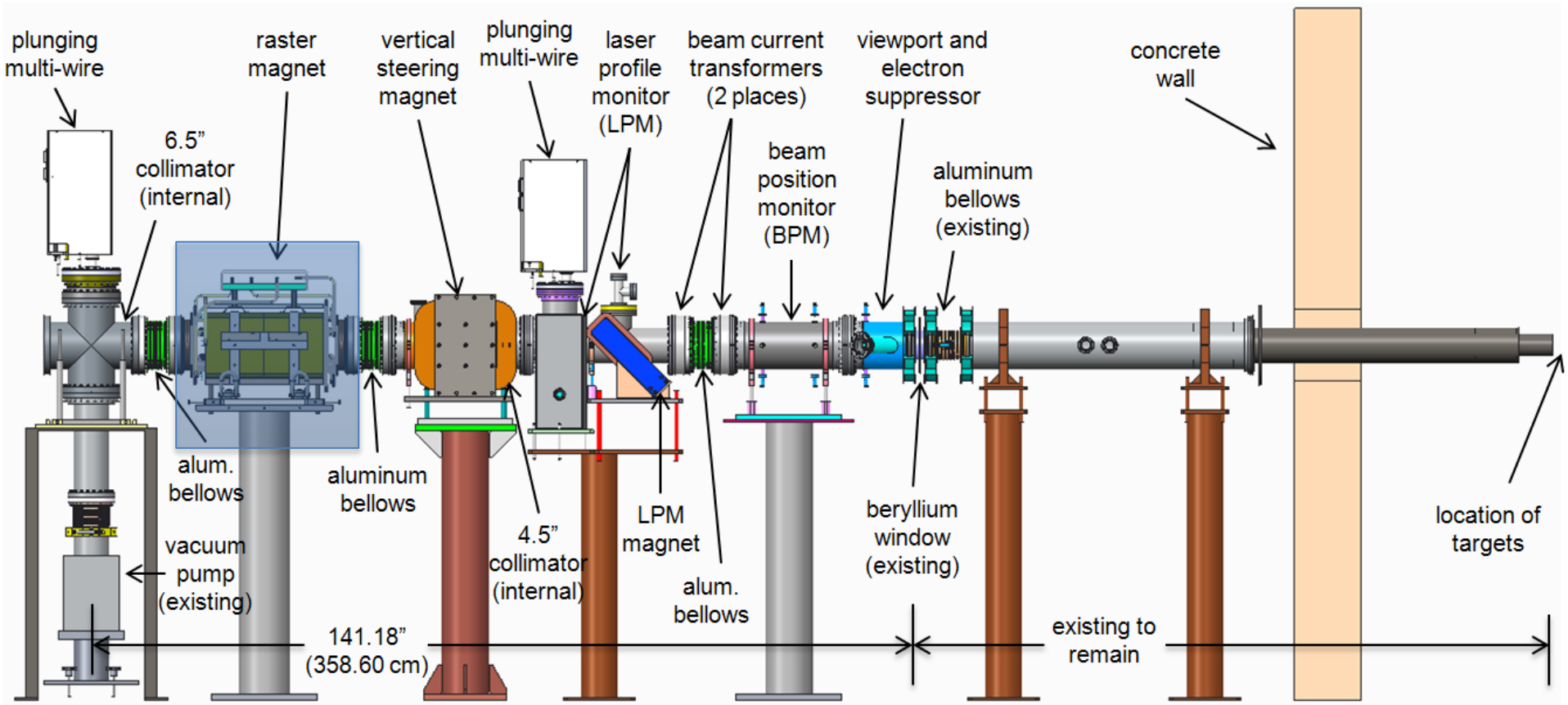

HEBT A
HEBT A
FROM THE END OF TANK 9
FROM THE END OF TANK 9
95 AR CONCRETE BLOCKS
95 AR CONCRETE BLOCKS
END OF TANK 9
MATCH LINE FOR CONTINUATION SEE DWG. NO. D25 M-1653-5
SEE DET 'D' SHEET 2
NC23
PD19
NQ17
NP9
ND9
NP16
ND16
163.25
207.00 (5.258 M)
227.94 (5.783 M)
NV28
NQ29
NE35
NX35
NT39
NX39
NM51
NQ42
NE48
NX48
NT31
NX31
373.45
470.42
499.94 (12.698 M)
524.68 (13.326 M)
527.38 (13.395 M)
630.70 (16.020 M)
650.42 (16.520 M)
NQ54
ROUGHING STATION
NQ7
NE1
NX1
BEAM ℄
BM#1 ℄
.500 OFFSET
"Y" CHAMBER ℄
PC23
PL23
PV25
OFFSET
SEE VIEW 'A' (SEE SHEET 2)
PQ49
PQ52
PD58 REF
174.79 GRAPHITE
Q
Q
Q
Q
Q
Q
2" ID
3" ID
4" ID
6" ID
3" ID
4" ID
3" ID
Graphite collimators
Graphite collimators



120				
121	264	HARDWARE SET .312-24UNF X 2.50 LG	BNL #I-05388	
122	680	HARDWARE SET .312-24UNF X 2.25 LG	BNL #I-05386	
123	100	HARDWARE SET .312-24UNF X 1.75 LG	HDC VAC. PROD. CORP. P/N 19010	
124	96	HARDWARE SET .312-24UNF X 1.25 LG	BNL #I-05390	
125	16	HARDWARE SET .250-28UNC X 1.25 LG	BNL #I-05382	
126	2	GASKET KIT ø8.0 GATE VALVE	HDC VAC. PROD. CORP. P/N 39406	
127	2	GASKET ø2.75 OFHC COPPER	BNL #I-05362	
128	2	GASKET ø6.0 OFHC COPPER	BNL #I-05368	
129	6	GASKET ø8.0 OFHC COPPER	BNL #I-05370	
130	8	GASKET ø10.0 OFHC COPPER	BNL #I-05372	
131	1	O-RING 10.75 ID X .125 WIDE	ON HAND	
132	6	GASKET ø6.0 ALUM	SMC PART NO. [illegible]	
133	17	GASKET ø8.0 ALUM	SMC PART NO. [illegible]	
134	10	GASKET ø10.0 ALUM	SMC PART NO. [illegible]	
135				

84	1	BLANK OFF FLANGE	D38-M-	
85	1	ION PUMP BASE PLATE	D38-M-	
86				
87	1	QUADRUPOLE	DANFYSIK	
88	1	TURBO PUMP, BALZER	TPU 510	
89	1	TURBO PUMP SUPPORT PLATE ASS'Y	D25-M-2	
90	1	WATER COOLED BEAM STOP	12ø, 24L	
91				
92				
93				
94				
95				
96				
97				
98				
99	1	TURBO-MOLECULAR PUMP	BALZERS P/N TPU 521	
100	1	6" VAC-U-FLAT ELBOW, 8" FLG	HORIZON P/N VF-60	
101	1	6" ELECTROPNEUMATIC GATE VALVE	VAT P/N 10944-KE4	
102	1	10" VAC-U-FLAT FLANGE, BLANK	HORIZON P/N 1000-1	
103	1	10" ZERO LENGTH ADAPT VAC-U-FLAT FLG	HORIZON P/N 1000-2	
104	1	8" VAC-U-FLAT 4 WAY CROSS	HORIZON P/N VF-80	
105	1	6" VAC-U-FLAT TEE, 8" FLANGE	HORIZON P/N VF-60	
106	2	GATE VALVE - ø8.0 CONFLAT FLANGES	HDC VAC. PROD. P/N 39406	
107				
108				
109	1	CERAMIC BREAK	KURT J. LESKER P/N CF115V	
110	1	CERAMIC BREAK	KURT J. LESKER P/N CF150	

New beam-line layout
All components except raster magnet were installed Oct. 2014



Project scope: Design, fabricate, install and commission a BLIP Raster system containing the components shown in the beam-line layout, and including all required mechanical, electrical and software systems.

Question # 3

Losses associated to PD 19 are two type

If any of RF system (Buncher, RFQ and 9 tanks) go out of tune ,
It causes energy tail in the bunch. Since PD19 is first bend , it is lost here

We accelerate H-, there are continuous stripping due to residual gas
Cross section at 117 MeV about 1.9 e-18 (cm^-2) , (about 0.35 nA per meter
for pressure 5e-7 torr and 115 uA, assuming 50% H_2, 25% N_2 and 25%O_2)
all the neutral are lost in the first band

Other stripping is called intra-beam stripping of H-,
its cross section is order of magnitude lower.

Question # 4

Last year measured beam size and simulated beam size is smaller than beam pipe everywhere

Vacuum pressure in BLIP line last year 1.3 e-6
Losses about 50 mW/m
This year 3.4 e-8, losses 3 mW/m

I can not estimate localized losses , where the leak was

Question #5

I am working on this
to find out sensitivity of the loss monitor (LRM) in the BLIP line

Next year we will have new BLM which are much more sensitive