Beam-In-Gap Laser System Layout in SNS LRBT

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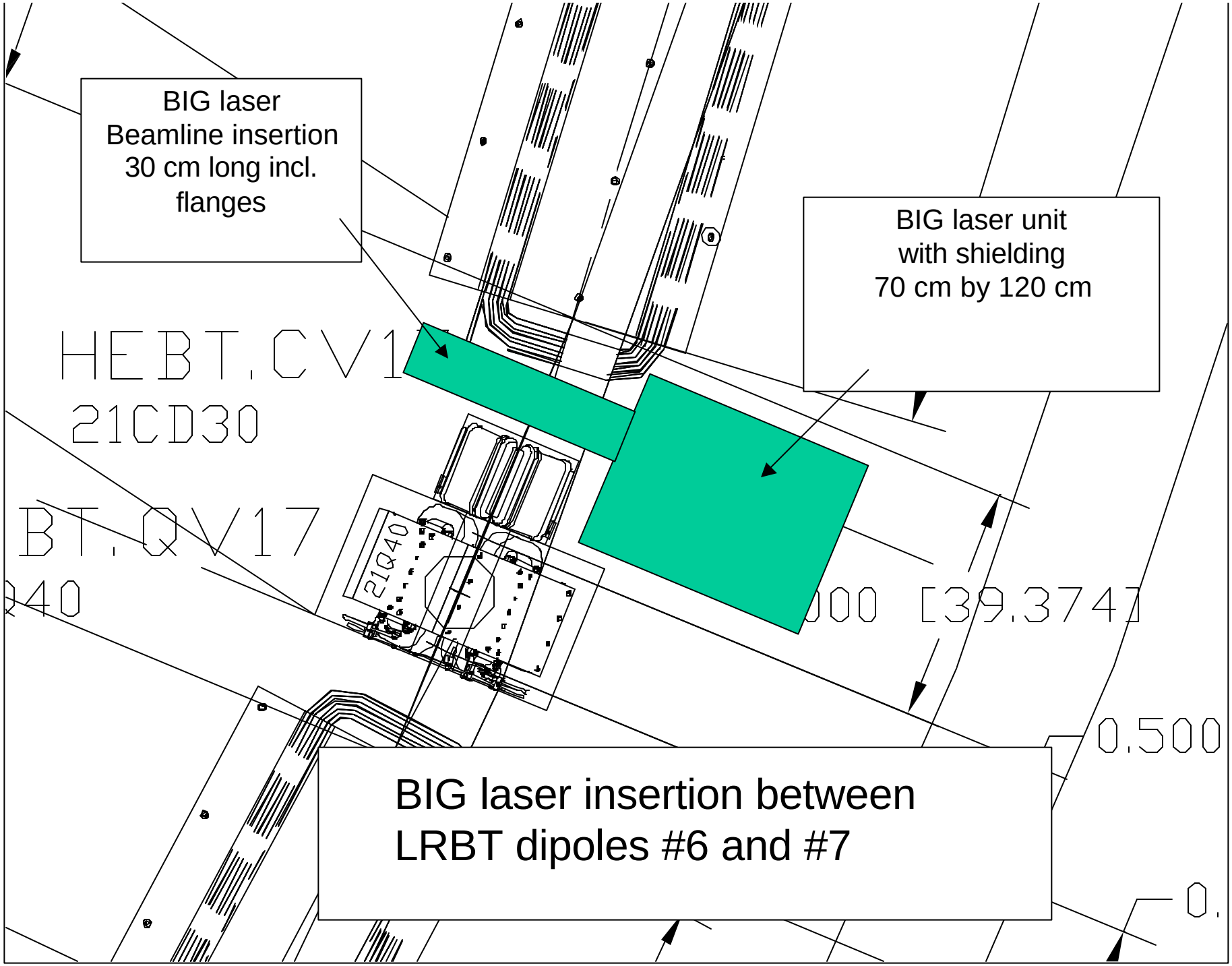
The attached drawings show the proposed layout of the Beam-In-Gap (BIG) laser system in the SNS Linac-to-Ring Beam transport (LRBT) line.

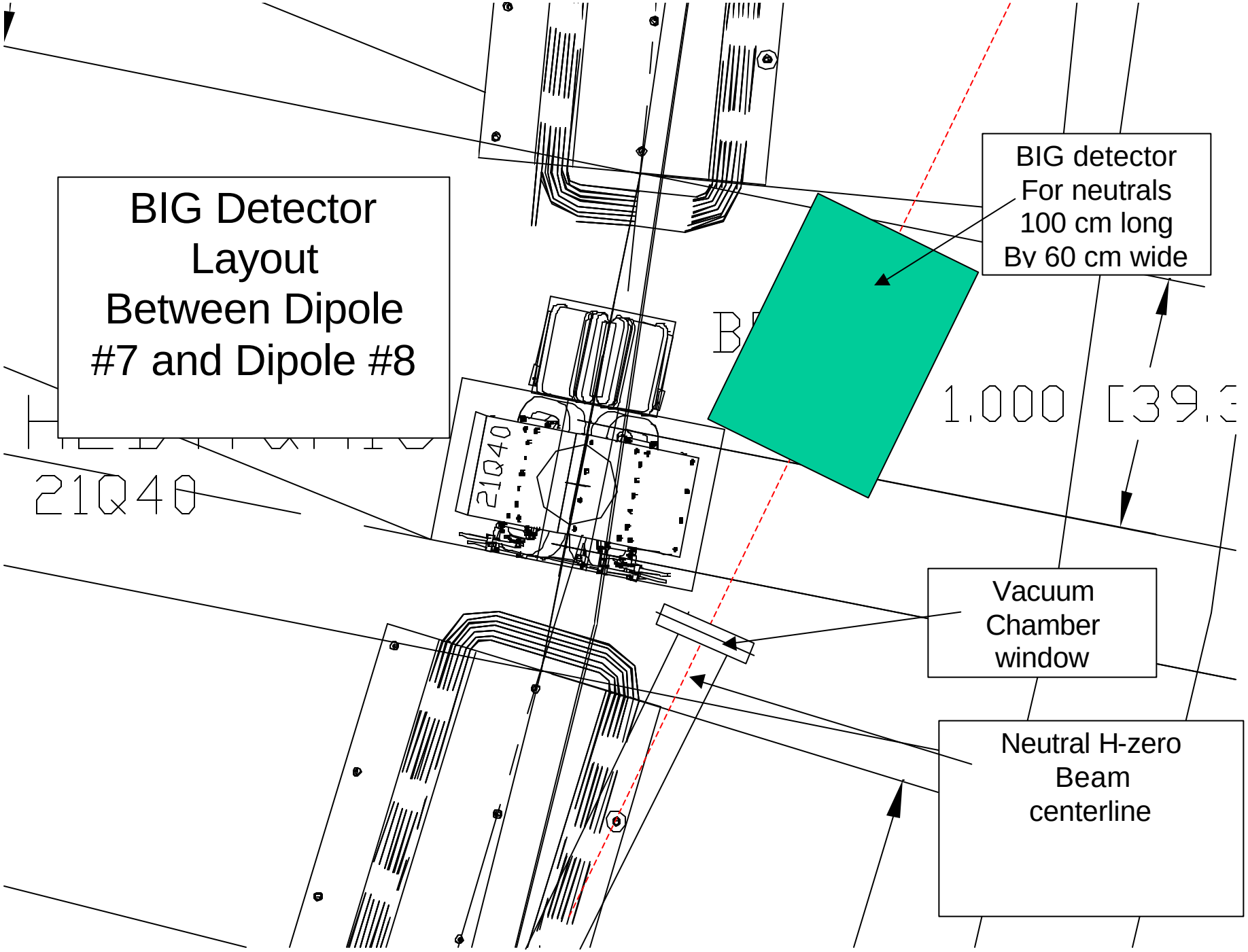
The laser neutralizer is located between arc dipoles #6 and #7, and the neutral beam detector is located between dipoles #7 and #8.

The laser unit requires a space 70 cm wide by 120 cm long, between the beamline and the outer tunnel wall. The beamline insertion requires 30-cm of beamline space, including flanges.

The neutral particle detector, located about 7 meters downstream of the laser, requires a space 100 cm long by 60 cm wide, immediately upstream of dipole #8 and downstream of quadrupole QH18, between the H- beamline and the outer tunnel wall. It is centered on the neutral particle trajectory, which begins at the point of neutralization upstream of dipole #7.

The vacuum chamber in dipole #7 is identical to the vacuum chamber in dipole #1, used for the linac beam dump line when dipole #1 is turned off. The vacuum chamber extends to a point downstream of dipole #7 where a vacuum window, at least 12-cm dia, is installed. The vacuum window strips the H-zeros to protons. The protons travel in air downstream to the detector (There is no air activation problem).


BIG laser
Beamline insertion
30 cm long incl.
flanges
BIG laser unit
with shielding
70 cm by 120 cm
HEBT.CV1
21CD30
BT.QV17
21Q40
[39.374]
0.500
BIG laser insertion between
LRBT dipoles #6 and #7


BIG Detector
Layout
Between Dipole
#7 and Dipole #8
BIG detector
For neutrals
100 cm long
By 60 cm wide
21Q40
21Q40
1.000
Vacuum
Chamber
window
Neutral H-zero
Beam
centerline