Raster Position Calculation for HDice in UITF

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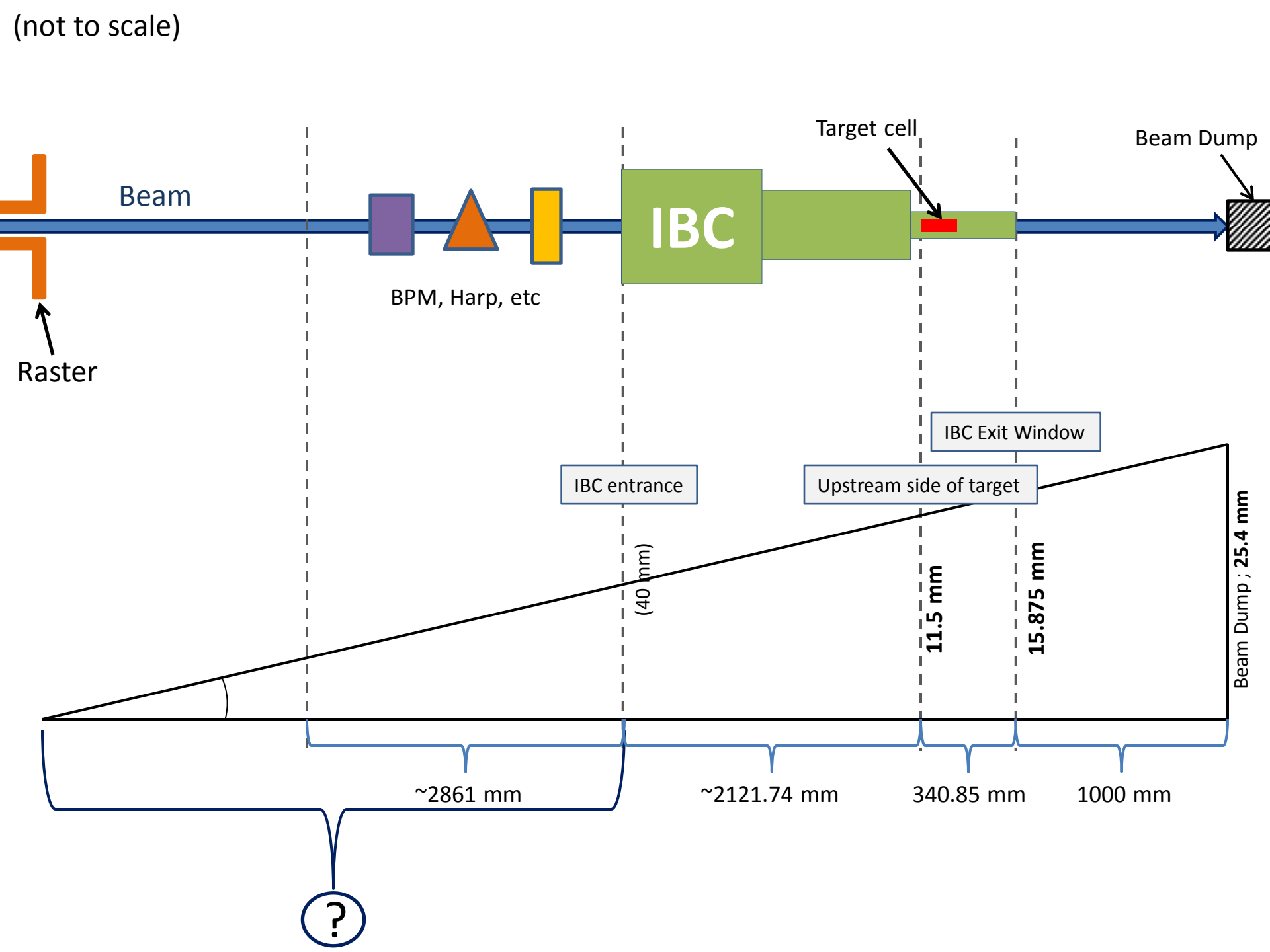
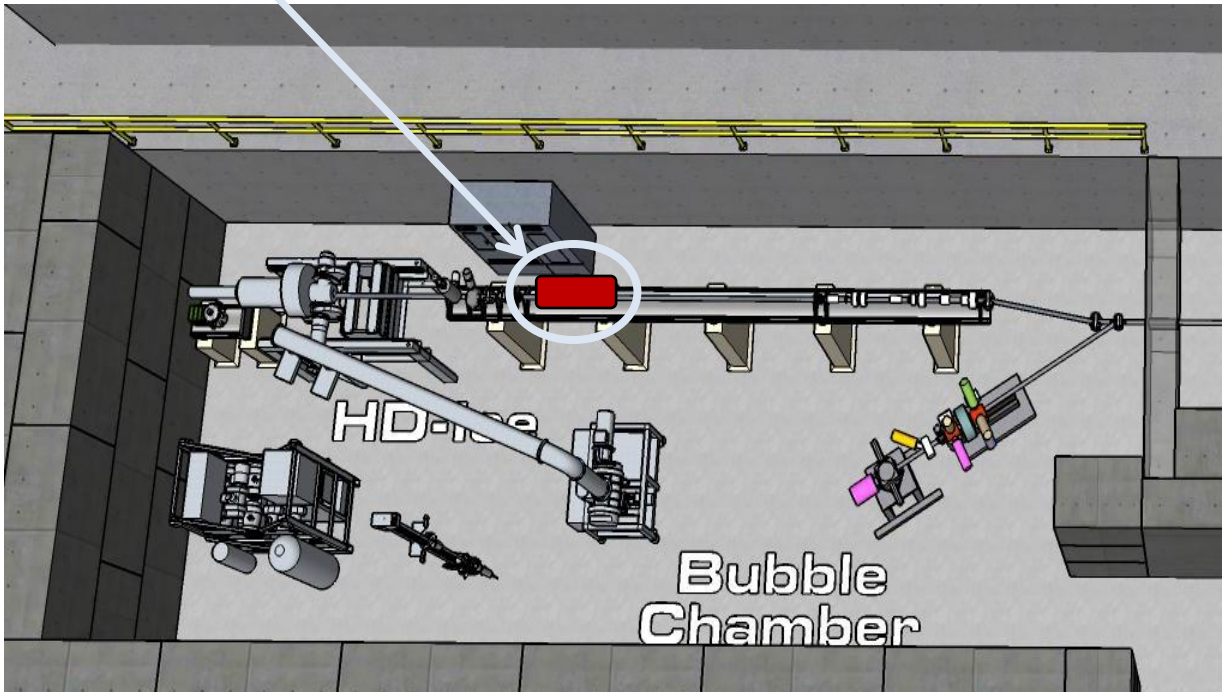
Restrictions/Requirements:

- Beam spot on upstream side of target cell should be 23 mm.
- Pass through 31.75 mm IBC Exit Window which is 340.85 cm downstream of entrance of target cell.
- Enter 5.08 cm Beam Dump which is 1 m downstream of IBC Exit Window.


(not to scale)
Target cell
Beam Dump
Beam
IBC
BPM, Harp, etc
Raster
IBC Exit Window
IBC entrance
Upstream side of target
(40 mm)
11.5 mm
15.875 mm
Beam Dump ; 25.4 mm
~2861 mm
~2121.74 mm
340.85 mm
1000 mm
?

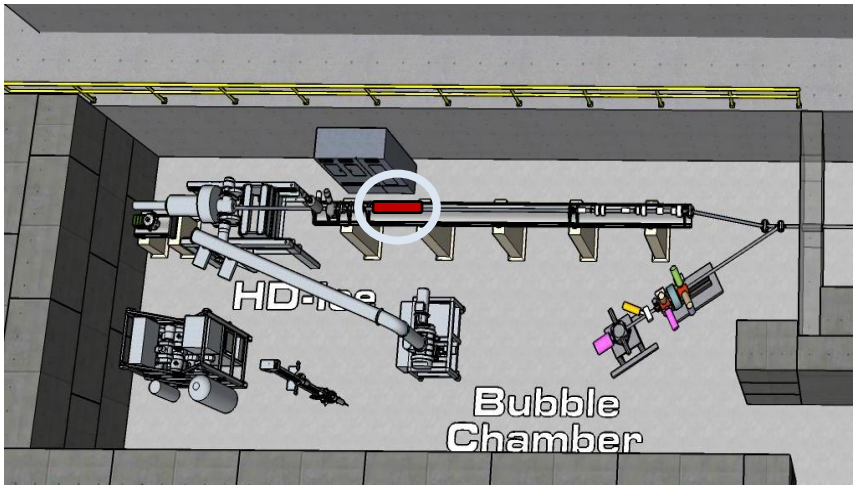
Where?: Position #1

- Assumed Raster is the 6 GeV Fast Raster using the driver for the 11 GeV Fast Raster (described in HDice Technical Note 28).
- Closest position (due to beamline components) is ~5m from IBC entrance.



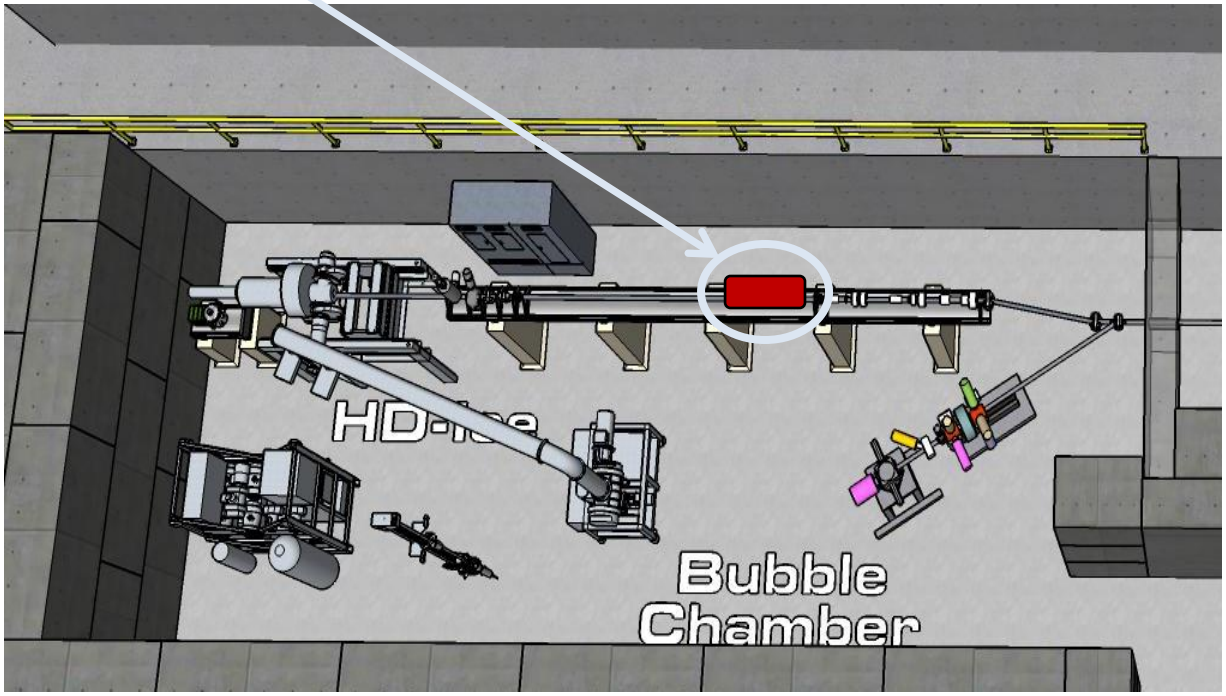
Where?: Position #1

- Assumed Raster is the 6 GeV Fast Raster using the driver for the 11 GeV Fast Raster (described in HDice Technical Note 28).
- Closest position (due to beamline components) is ~5m from IBC entrance.
- Beam radii:
    - 11.5 mm at upstream side of target
    - 12.285 mm at IBC exit
    - 14.593 mm at Beam Dump
    - 6.5% of full power



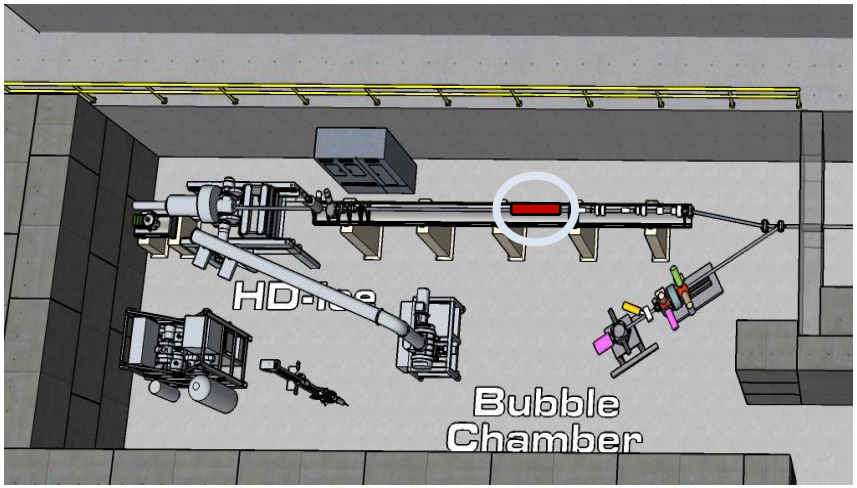
Where?: Position #2

- Assumed Raster is the 6 GeV Fast Raster using the driver for the 11 GeV Fast Raster (described in HDice Technical Note 28).
- Farthest position (due to last bending magnet) is ~8.6m from IBC entrance.



Where?: Position #2

- Assumed Raster is the 6 GeV Fast Raster using the driver for the 11 GeV Fast Raster (described in HDice Technical Note 28).
- Farthest position (due to last bending magnet) is ~8.6m from IBC entrance.
- Beam radii:
    - 11.5 mm at upstream side of target
    - 11.955 mm at IBC exit
    - 13.288 mm at Beam Dump
    - 3.8% of full power



Conclusion:

- The Raster can go anywhere in the available space of the UITF beamline.

To Do:

- Obtain exact dimensions of proposed beamline and its components.
- Determine how low we can go in Raster power while maintaining control.