# SNAKE Update

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# Update

- Q1 updated with real value
- Extended septum field region from -55.5~60cm to -75.5~66cm (total BdL loss 4.5% to 1.5%)
- Add in HRS offsets to a few boxes
- Updated start point

Suvey

The central ray of the spectrometer is at -12.495 degrees.
It is missing the defined target center by 2.09 mm upstream,
and -0.16 mm vertically (positive = up).

The central ray of the spectrometer is at -12.498 degrees.
It is missing the defined target center by 1.83 mm upstream,
and -0.40 mm vertically (positive = up).

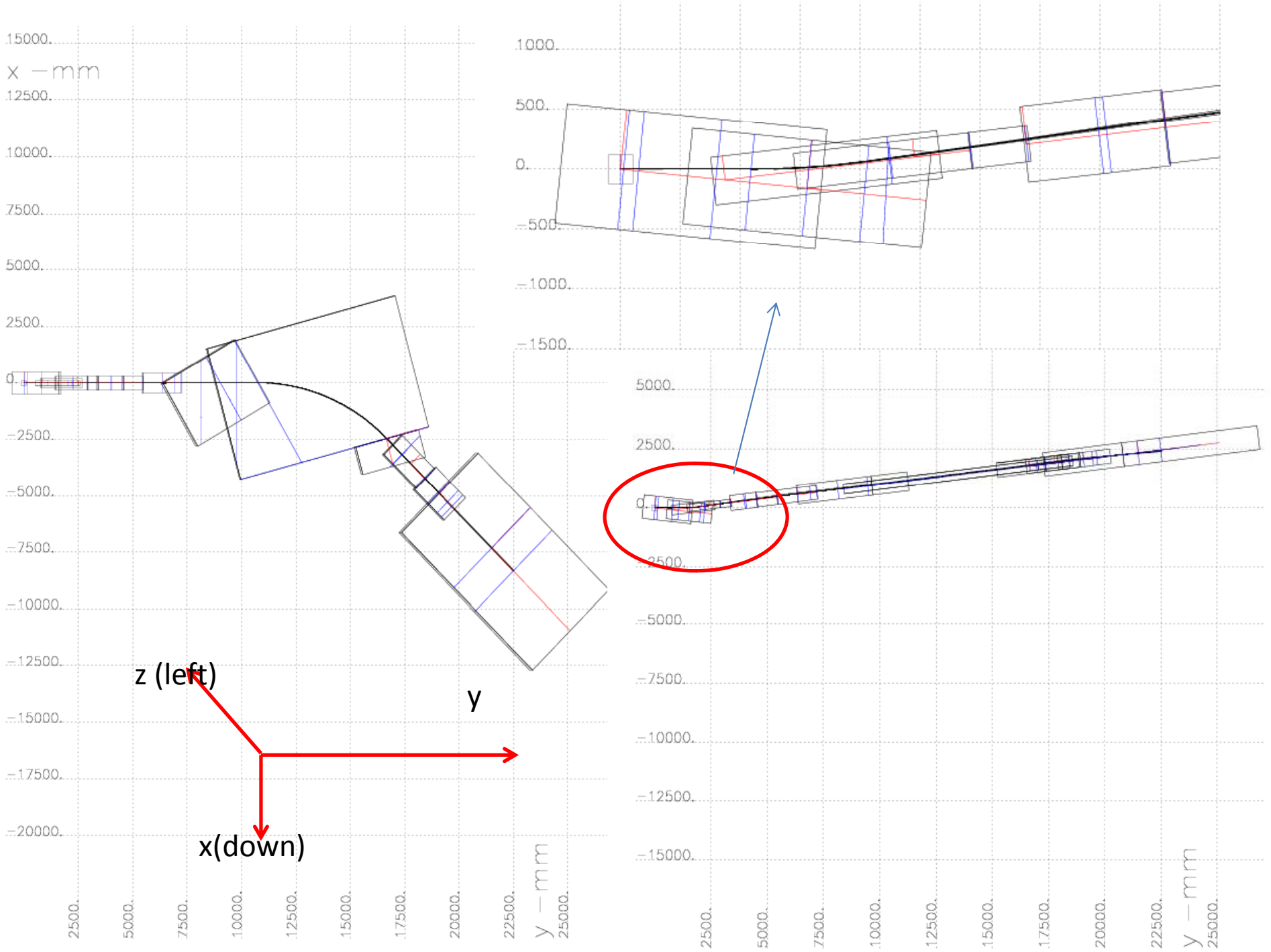
# First Order Matrix

| | x0 | theta0 | y0 | phi0 | delta |
|---|---|---|---|---|---|
| x | -2.43E+00 | -9.88E-02 | -1.85E-01 | -4.21E-01 | 1.34E+01 |
| Theta | -2.17E-01 | -4.21E-01 | -2.02E-02 | -4.86E-02 | 2.32E+00 |
| Y | -3.37E-02 | 1.64E-01 | -1.29E-01 | -1.96E+00 | |
| phi | -5.25E-02 | 2.24E-01 | 4.46E-01 | -9.95E-01 | |

HRS with 1.96mm left offset

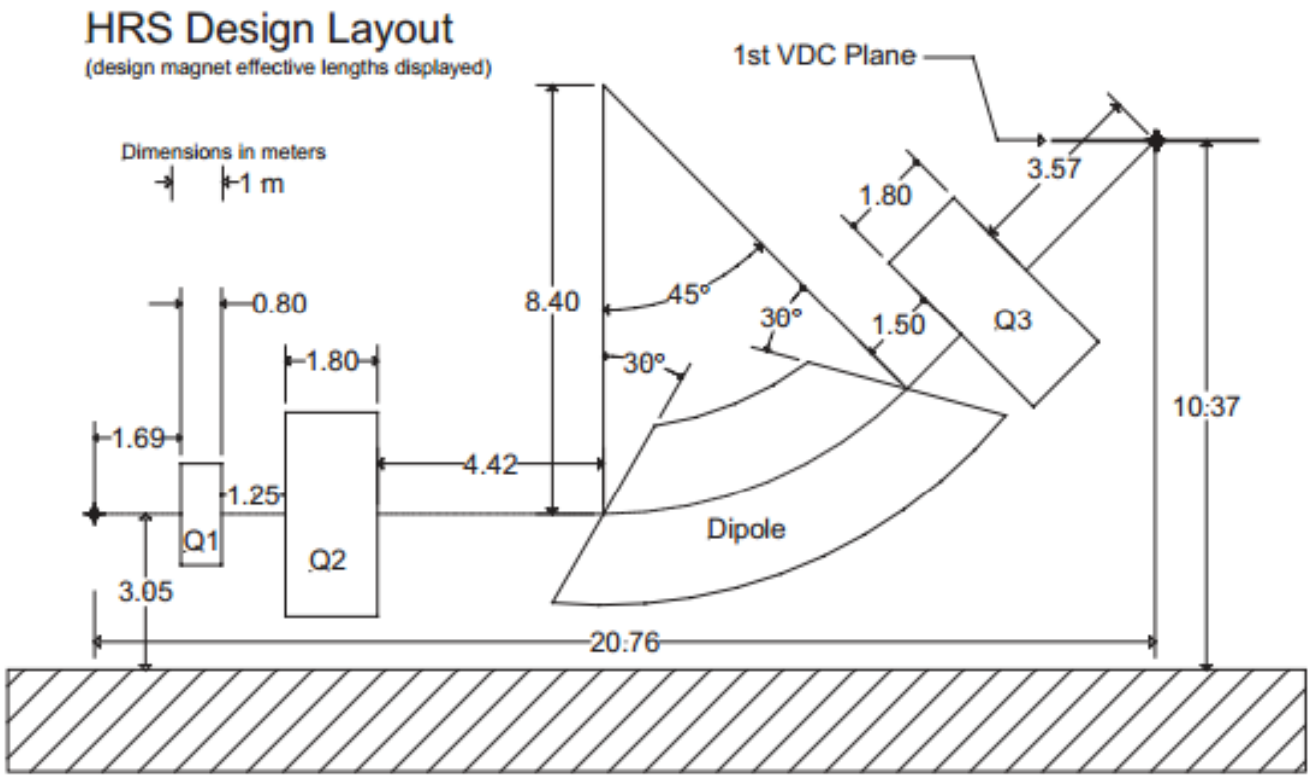
| | x0 | theta0 | y0 | phi0 | delta |
|---|---|---|---|---|---|
| x | -2.42E+00 | 4.97E-02 | -6.40E-02 | -1.17E-01 | 1.35E+01 |
| Theta | -2.26E-01 | -4.08E-01 | 5.32E-04 | -4.73E-03 | 2.33E+00 |
| Y | 3.33E-02 | 4.19E-02 | -1.13E-01 | -1.93E+00 | |
| phi | 2.43E-02 | 5.08E-02 | 4.59E-01 | -9.88E-01 | |

HRS no offset


x −mm
y −mm
z (left)
y
x(down)

tg center to hall center 876.93mm, septum center 686mm

| | x | y | z | Angle z | Angle x | Angle y | Ref coord |
|---|---|---|---|---|---|---|---|
| Tg box | 0 | 0 | 0 | 0 | -5.77 | 0 | TCS |
| septum | 0 | 1555 | -157 | 0 | -5.77 | 0 | TCS |
| Hall | 0 | 872 | -88 | 0 | 6.73 | 0 | TCS |
| Q1entr | 0 | 1590 | 1.96 | 0 | 0 | 0 | Hall |
| Q1ext | | | | | | | Q1entr |
| Q1Q2 | | | | | | | Q1ext |
| Q2entr | | | | | | | Q1ext |
| Q2ext | | | | | | | Q2entr |
| QDdrift | | | | | | | Q2ext |
| Dipole | -2460 | 15900 | 1.96 | 75 | 0 | 0 | Hall |
| DQoverlap | | | 1.96 | 75 | 0 | 0 | Hall |
| Q3entr | -3586 | 17026 | 1.96 | 45 | 0 | 0 | Hall |
| Q3ext | | | | | | | Q3entr |
| Drift | | | | | | | Q3ext |


HRS Design Layout
(design magnet effective lengths displayed)
Dimensions in meters
1 m
1st VDC Plane
3.57
1.80
Q3
1.50
45°
30°
30°
8.40
10.37
0.80
1.80
1.69
1.25
4.42
Q1
Q2
Dipole
3.05
20.76

# Current Result

- After tuning septum field, taking phi or y as priority to match

| | X(mm) | Theta(mrad) | Y(mm) | Phi(mrad) |
|---|---|---|---|---|
| data | 2.52 | 0.49 | -16.19 | -8.47 |
| SNAKE (y) | 5.93 | -0.70 | -16.21 | -16.93 |
| SNAKE (phi) | 6.00 | -0.67 | -7.43 | -8.50 |

- Reference: (0,0,,0,0) start point, no HRS offset

| | X(mm) | Theta(mrad) | Y(mm) | Phi(mrad) |
|---|---|---|---|---|
| SNAKE (y) | 1.9 | -0.3 | -6.33E-03 | 2.783 |
| SNAKE (phi) | 1.9 | -0.3 | -2.87 | 9.79E-04 |

- Beam position (Hall coordinate)
  - x=4.373+-1.658 mm
  - y=1.503+-1.018 mm
  - theta=0.00177+-0.001179 rad
  - phi=0.005534+-0.0018 rad