Beamline Summary.

-*Since we last met at cm19*

-*Outline plan*

-*Beamline functionality: Proton Optics*

-*What we'll want to do & alignment simulations*

-*Beam monitor positions*

-*Detector calibration beamlines*

-*G4Codes*

K.Tilley, CM20, 13/02/08

Thanks in particular to MZ, TJR for their help over the past month.

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Since we last met… (cm19-> cm20)

- *U/str Beamline height fix ("38mm") & new target box*

- *Beamline review (slits, vsmgts, pion beam, diagnostics)*

- *Proton optic decision.*

- *Proton absorber !*

- *Beamline magnet services & polarities.*

- *….*

Outline plan (emphasising beamline)

Anticipating….

This ISIS Cycle:-

- *Pre-commissioning until ~20th Feb.*

- *Target commissioning ~ 20th Feb +*

- *Beamline functionality: ~1week > ~20th Feb*

- *(Design) & setup detector calibration beamline(s): 1week March*

- *Initial Particle production? (March?)*

-   *Next ISIS Cycle:-*

- *Proton beamline to commission d/solenoid & Q7,8,9*

- *Re-setup detector calibration/particle production beamline(s)*

- *Begin Pion & Muon beamlines setup, for 6π, 200 beamsizes, & divergences (Step1)*

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Proton Beamline

- *Proton beamline –*
  since rates otherwise too low.

- *Currently have just*
  2 u/str p / supplies.

- *Designed beamline for Q1,Q2.*
  only. Q4,5,6 if available.

- *Pursue triplet design for Q1-Q3.*
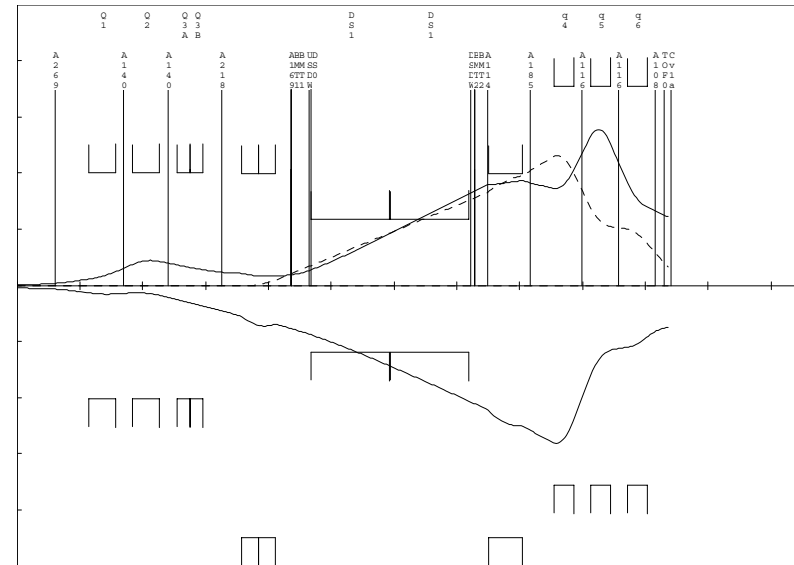
Beamline functionality: - outline steps.

- *Still in development but….*

- B1, B2 on only.

- Set H alignment @ Q6

- Probe vertical misalignment of beamline & target eg Q1 scan.

- Exercise upstream beamline Q1,2,3.

- Find d/str H alignment incl quads Q4,5,6

- Exercise downstream beamline Q4,5,6.
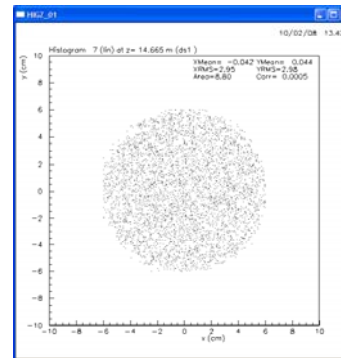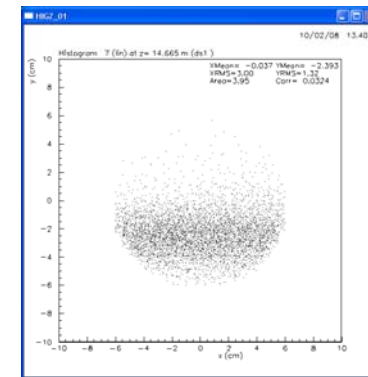
- Estimate protons on target from Ckov1 etc.

... potential alignment methods:

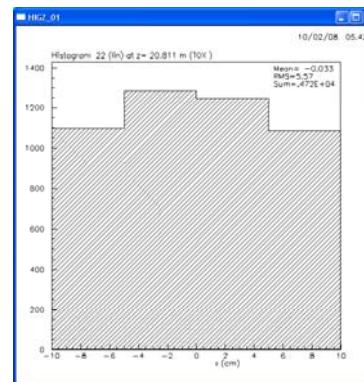- *Measurement of vertical misalignment of target & beamline, @ d/str decay sol:-*
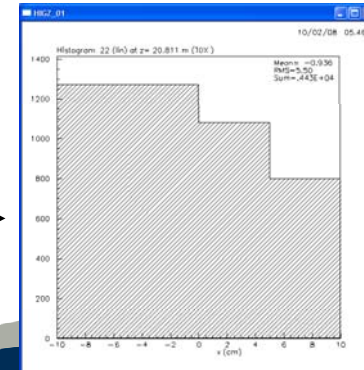
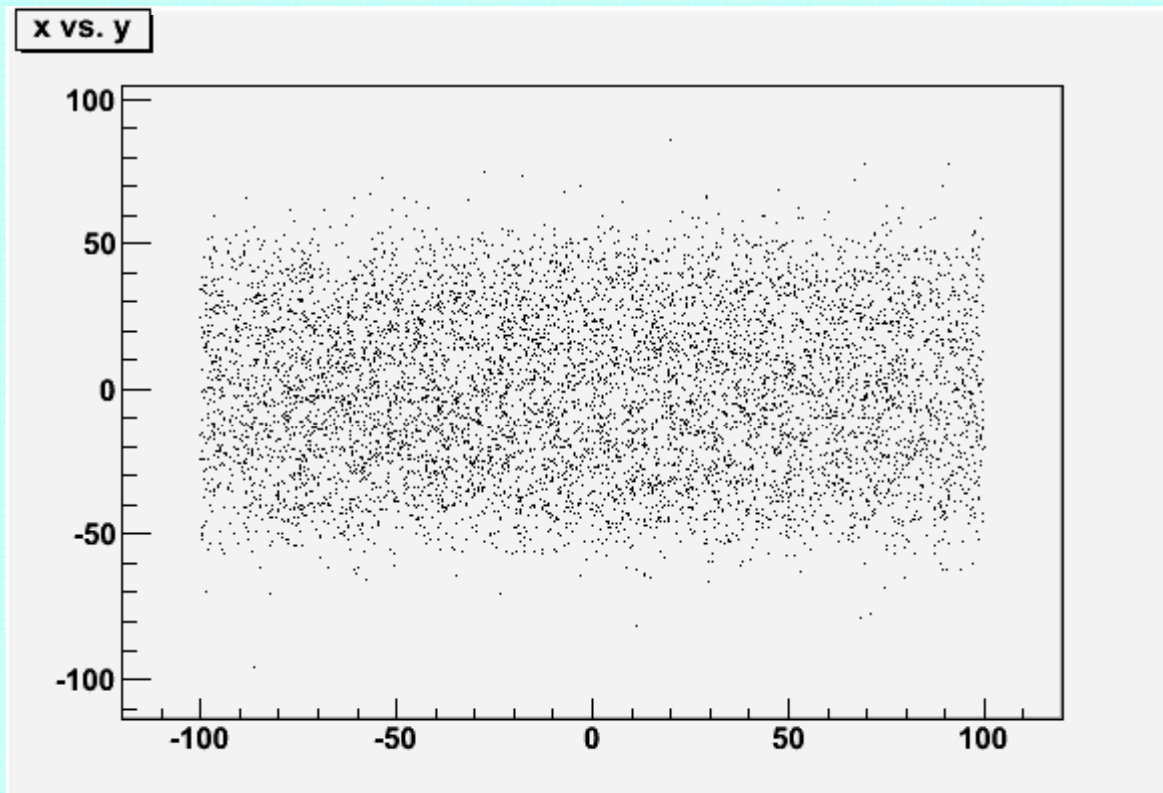5mm target/beamline misalignment.

- Q1 power ed :-

- *Horizontal alignment with B1, B2 only, @ Q6:-*

- B2 2% too low

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Proton beamline – example diagnostics profile from target flux (no segmentation)

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x vs. y

- Vertical half-aperture of B1 = 76.2
  ⇨ vertical focusing
- Horizontal half-width of Monitor = 100

Proton beamline - G4BL evaluation

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- Prospects for early beam have just B1, B2, Q1, Q2 powered

- G4beamline was used to simulate this tune, including normalization to protons on target.

- Target model includes protons, pi+, e+, gammas; all mimic distributions from protons on the target.

- For 1E10 protons intersecting the MICE target:-

- At Ckov1a:
  - 9 mu+   ie. 31 Ckov1a "hits".
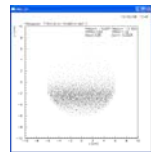 - 22 pi+
  - 252 protons (invisible)

Beam position monitor comments:- February only.
(w/o decay solenoid)
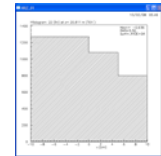

INTERLOCKED SLIDING GATE

DE-MIN
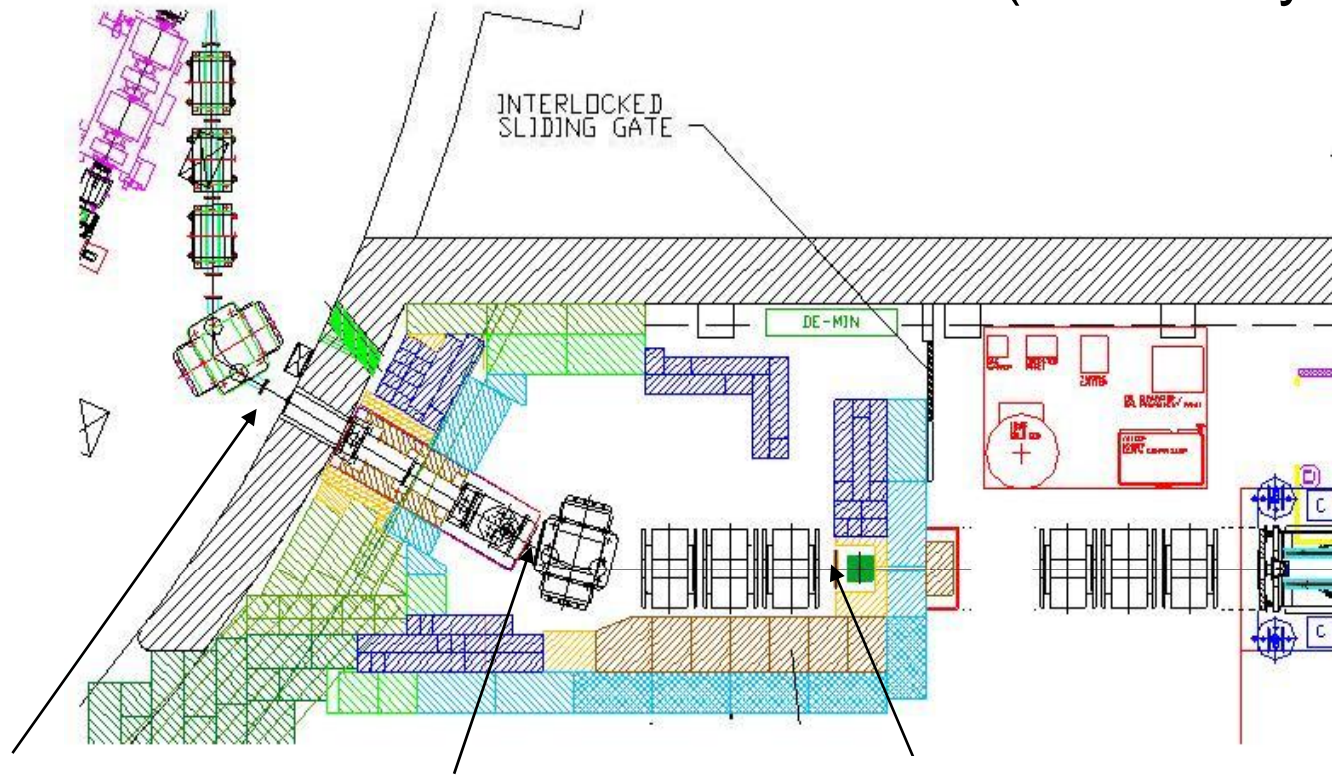
- ~ Dipole vert alignment.
- Intensity.v.u/str optics
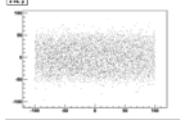
- Target vert alignment.
- Intensity.v. u/str optics

- B1/B2 horizontal alignment.
- Beamsizes.v.d/str optics
- Intensity.v.d/str optics

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Beam position monitor comments:- February only.
(w/o decay solenoid)

Beamline session proposal (current default):-

- on synchrotron access – remove monitor IC1 from vault <u>to fix Xtalk/Noise</u>

- place IC2 on d/str end of decay solenoid.
- place IC1 when re-available (~1-2week?) end of Q6.

- place Geneva monitor at end of Q6 (TOF0 position) to count absolute flux.

- This still meets with unpopularity still ….. ☹

- I will find a scheme / sequence of placements which is realistic and meets needs of checking the early beamline from the 20th.

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Detector calibration beamline(s):

Beamline session advised :-

-proton beamline will be useful for calibration.

-make pion beamline next @ 'normal' energy

(choose ~444MeV/c from target)
(Q: are background protons ok?)

-electron beamline @ 50-100MeV/c

G4Codes:

- G4MICE

  – critical to reconstruction, analysis, MICE…

- G4Beamline

  – critical to designing and supporting
    setup of our beamline.
    We are slipping backwards on this for want of
    people. Have one new volunteer.

  [Tom will give a 'how to' on the MICE G4BL
   functions we use, after the Wrapup talk, in the
   R76 conference room]

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Beamline Summary.

- *Outline plan*

- *Proton Optics*

- *Proton optics setup, .*

- *Beam monitor positions*

- *Detector calibration beamlines*

- *G4Codes*

- *We will need beamline people with experience to man shifts very soon.*

- *Thanks to MZ, TJR in particular for their help over the last month.*