BPM Status

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Beam Package

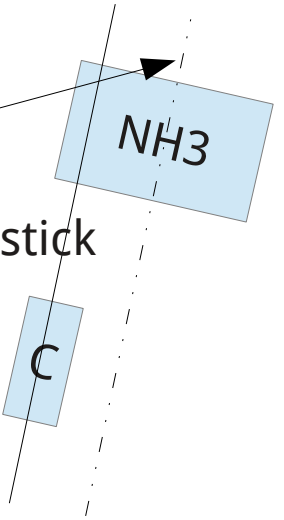
- Now database support to use import function
  - don't need to copy whole file for new configuration if just change a little (for example different target)

- New database for non-straight configuration
  - position mapping from 2 bpms to target

– 5 orbits for non-straight configuration

– 2 target (NH3, C), can generate more
NH3: -14.135mm, 0mm, 14.135mm
C: -10.81mm

Assume g2p target magnet coil center is in the center of NH3 cell(plus survey info)



run period	energy	field(T)	angle	Yves' orbit	left	right
~3.06 07:30 3.13 18:00~3.14 10:00		straight		0	~2854 3167~3199	~21931 22248~22272
3.06 19:00~3.09 08:00 3.14 16:00~4.9 9:00	2.2GeV	2.5	90	5	2885-2997 3200~3956	21932~22071 22273~22987
4.10 00:00~4.17 09:00	1.7GeV	2.5	90	4	3957~4582	22988~23517
4.20 04:00~4.29 17:00	1.1GeV	2.5	90	1	4696~5326	23619~24104
5.02 21:00~5.09 09:00	2.2GeV	5	0	0	5441~5902	24217~24591
5.09 22:00~5.14 08:00	2.2GeV	5	90	7	5903~6100	24592~24727
5.14 20:00~	3.3GeV	5	90	9	6101~	24728~

Run Period during experiment

Can find in beampackage database

New database file for non-straight configuration

Orbit
For each run

In pyDB directory:

bcm calibration.ods
period.ods
runcurr.pkl
bpm_22250_0.dat
bpm_22250_1.dat
bpm_3169_0.dat
bpm_3169_1.dat
……

Makefile
bpm_1_0.c
bpm_1_-10.c
bpm_1_-14.c
bpm_1_14.c
bpm_9_0.c
bpm_9_-14.c
bpm_9_14.c
……

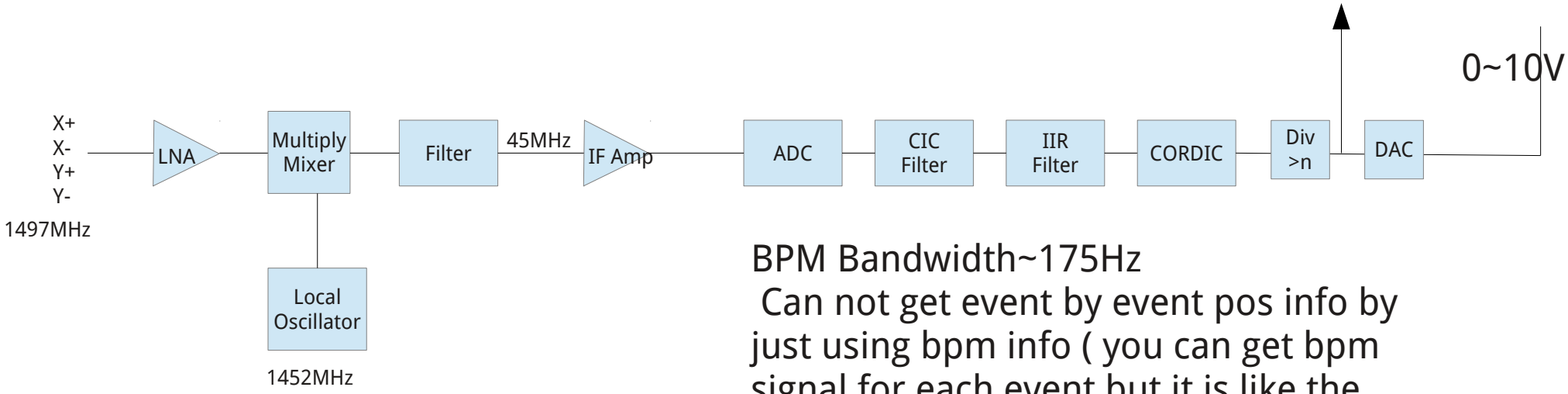
Position mapping function for Non-straight configuration (generated by mudifi and beamDrift simulation)

Need to compile before use (use Makefile in database)

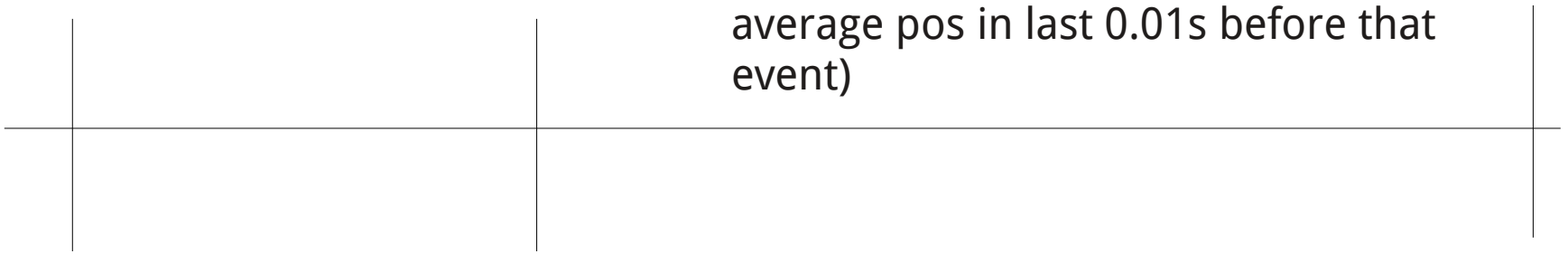
Didn't check,will check it later, and add uncertainty calculation

Will generate a database which include target info, orbit, current for each run

New Problem



BPM Bandwidth~175Hz
Can not get event by event pos info by just using bpm info (you can get bpm signal for each event but it is like the signal you got for that event is the average pos in last 0.01s before that event)



BPMA
Ave pos
(1000events)

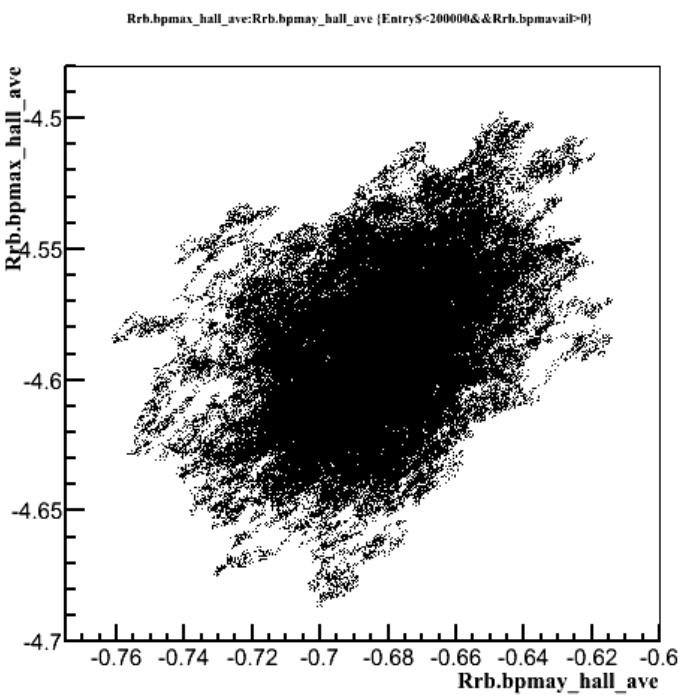
BPMB
Ave pos
(1000events)

Tgt
Ave pos

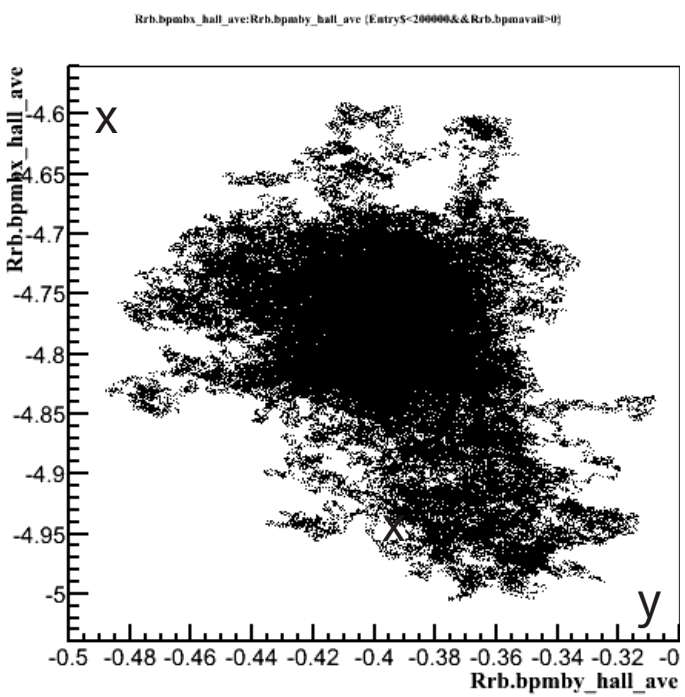
Use raster to get event by event pos (what about non raster setting(optics))

BPMA pos

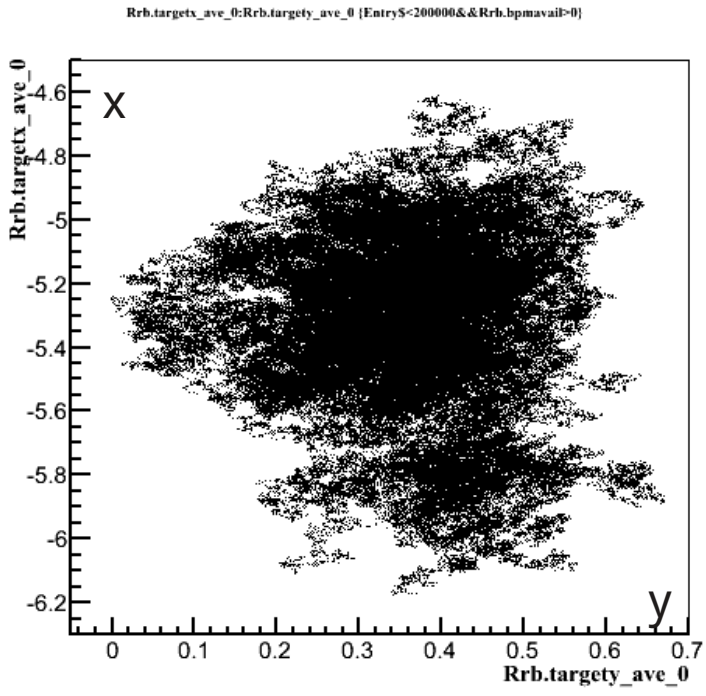
BPMA pos



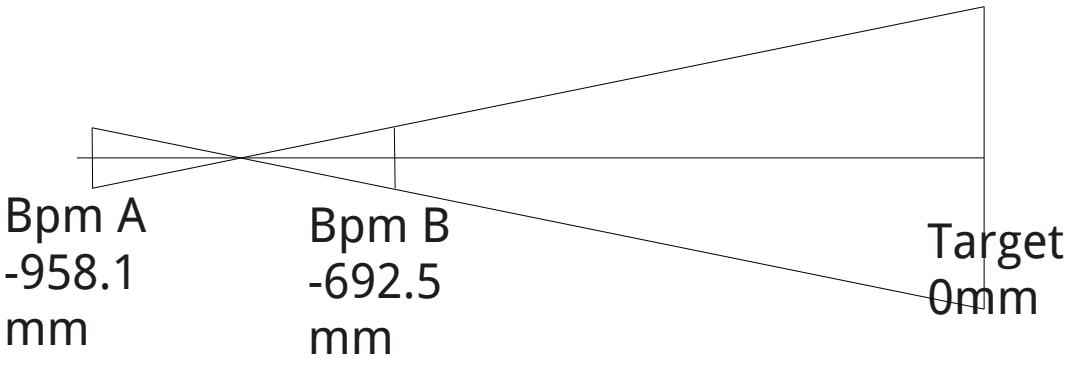
Average pos in bpm A
(1000 events)



Average pos in bpm B



calculated pos in tgt



For Straight Through:

$X_{tgt}=X_a+(Z_{tgt}-Z_a)/(Z_b-Z_a)*(X_b-X_a)$

Which X_a,X_b,X_tgt is position in bpma,b,tgt

Z_a,Z_b,Z_target is bpma,b,tgt's z position

Can calculate the uncertainty in target:

$dx_{tgt}=Z_a/(Z_b-Z_a)*dx_b+Z_b/(Z_b-Z_a)*dx_a$

Which dx_a,dx_b,dx_tgt is pos uncertainty in bpm a,b,tgt

→ Huge uncertainty in target

Jixie's suggestion

- For straight through average bpm a and b position and use it for target position
  - Reason: – less uncertainty after calculation
    - Design limit smaller than uncertainty?
  - Question: – 2 bpms were designed for calculating beam angle, if average them then that means you assume the beam go through the z position with 0 degree angle
    - how much uncertainty for this?(50ur?) where is that number come from?
    - what about the non-straight configuration? The problem is still in there.

Next step

- Add uncertainty in minuit fit for bpm calibration (will affect calibration constant)
- Calibration constant for all runs
- Raster calibration
- Add Toby's raster reconstruction code
- Add Happex decoder in g2plib (for decoding raw data from happex, happex has better uncertainty than fastbus)
- Fix the problem mentioned before (large uncertainty in target and non-linearity)
- Do the bpm noise study for low current, improve the bpm accuracy in low current