RHIC Polarimetery: p-Carbon

Status

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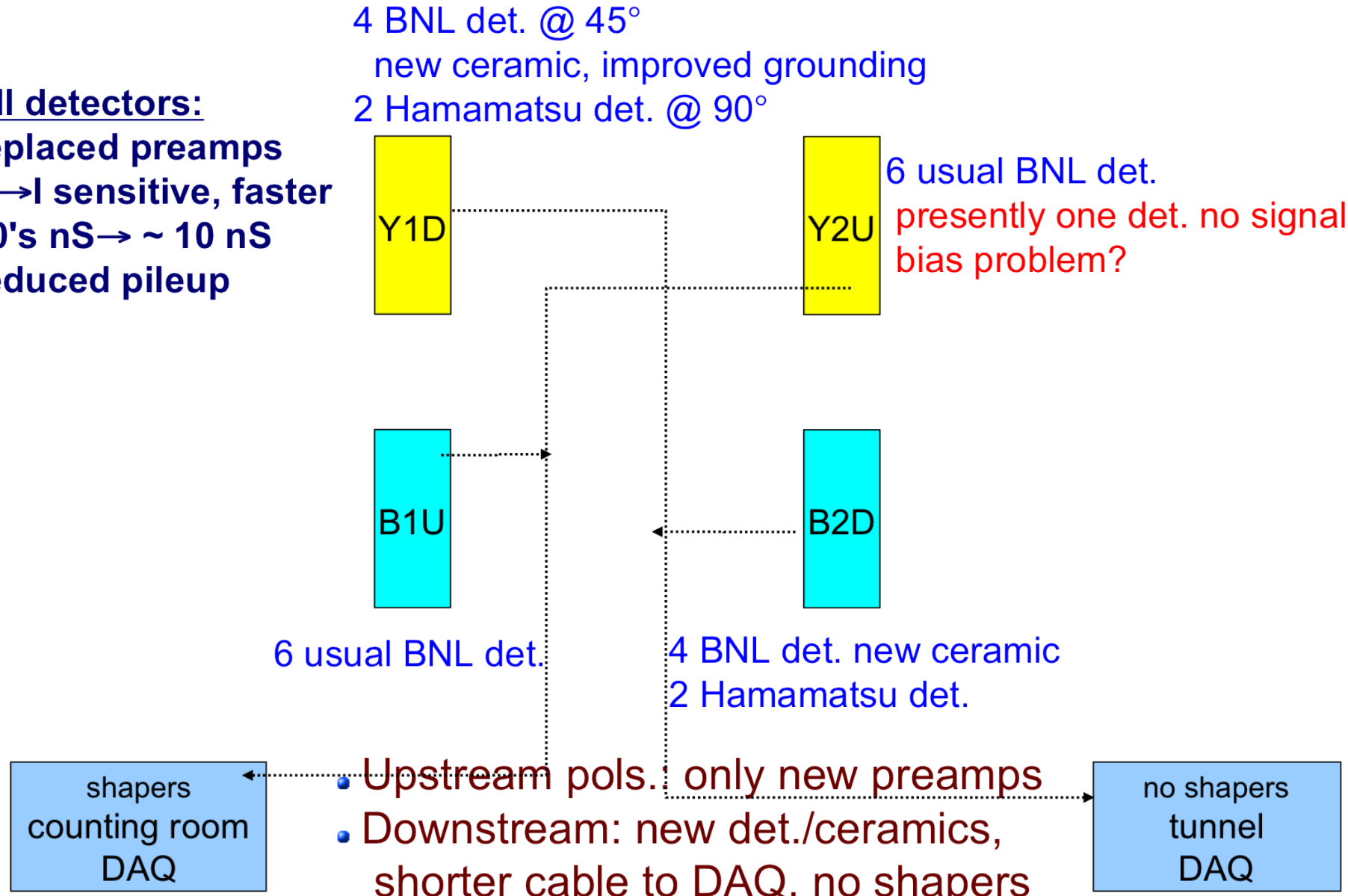
p-Carbon Polarimeters in 2011

All detectors:
replaced preamps
Q→I sensitive, faster
10's nS→ ~ 10 nS
reduced pileup



Online Activities

- Week of 01/29 - 02/04
  - **Jan 30:** Disabled even channels (crate 6) from downstream readout
  - **Feb 1:** Powered off both downstream crates to prevent further damage
  - **Feb 3 (Access):**
    - Bias current readbacks for Y2U broken since Christmas
      - Repaired shorted connector, corrected wrong channel mapping in software
      - All 6 detectors sensible current readback now
    - Y2U detector 4 dead since sometime December
      - Replaced preamp box (bias supply, signal readout)
      - Detector 4 looks alive now with alpha runs; need to check in carbon scans
    - Performed linearity scans with different attenuators using the pulser
      - For comparison DAQ in tunnel (short cables, no shapers) with external DAQ (long cables, shapers)
    - Visually inspected targets and checked target motor encoders
      - About 7 out of 48 total targets are gone
      - A couple more loose

Offline Activities

- Extracted calibration parameters using Run09 procedure

$$E_{\text{meas}} + E_{\text{loss}} = \frac{M_C}{2} \times \frac{L^2}{(t_{\text{meas}} + t_0)^2}$$

  - where $E_{\text{loss}} = E_{\text{loss}}(E_{\text{meas}}, x_{\text{DL}})$

- Remarks:

  - The dead layer value should not be taken too literally
  - Online analysis does not apply energy-dependent correction to calculate polarization
  - Online analysis uses the average E_{loss} corrected for x_{DL}

Offline Polarization Results

- Injection Runs, $\sqrt{s} = 47$ GeV

Polarimeter	**Run**	**P, %**	DL, μg/cm^2	t_0, ns
B1U	15057.001	48 ± 3	$\sim 65 - 70$	~ -10
Y1D	15019.102	61 ± 6	~ 65	~ -4
B2D	15019.202	46 ± 3	~ 60	~ -2
Y2U	15057.301	52 ± 3	$\sim 65 - 70$	~ -12

- Flattop Runs, $\sqrt{s} = 500$ GeV

Polarimeter	**Run**	**P, %**	DL, μg/cm^2	t_0, ns
B1U	14958.001	33 ± 2	$\sim 65 - 70$	~ -2
Y1D	14958.101	44 ± 4	~ 60	~ 7
B2D	14958.201	34 ± 4	$\sim 50 - 55$	~ 8
Y2U	15044.305	48 ± 5	~ 80	~ -4

- More plots available at `http://yellowpc.rhic.bnl.gov/rundb/`

Summary and Plans

- Update calibraton constants (E_{loss}, t_0) in online
- We hope to start "mass production" analysis of all taken runs (checks for stability)
- Check detector responses from the attenuator scans
- Online
  - Excercise the downstream system and decide whether to keep it in the tunnel
  - Need consistent measurements from all detectors in the same fill
  - Check these are in agreement with AGS
- Try to analyse AGS data with same software. . . ?