March 5 Aperture Scan Experiment

IFR response

Single Beam Running
The X and Y angles of the HER and LER beams were varied
HER and LER currents varied

Background Remediation Hypernews Item 898
Quick Summary

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- “We took single beam data: for each beam, scan in x-angle, scan in y-angle (both taken at low current), and high current data taking with angles set to their optimum values (with respect to background). Babar has been ON most of the time.”

- The IFR is sensitive to the variations in the HER and LER angles and currents; however, the scale of the IFR sensitivity to the HER or LER beams alone is much smaller than the IFR’s sensitivity to the PEP luminosity

- The PEP luminosity determines the major portion of our counting rate
The March 05 Scans ... currents

Time Interval (One minute each)
The scans ... HER and LER x, y-angles

HER x-angle
20-60
HER y-angle
60-100
HERCUR
105-135
LER x-angle
175-230
LER y-angle
260-320
LERCUR
320-400
For comparison later: we show the inner forward endcap scaler rates as a function of PEP luminosity.

Data running Feb 15-16

This sets the scale of the luminosity dependence.
Compare this to the dependence on the LER current, measured March 05.

This sets the scale of the overall dependence on the LER beam.
The dependence on the HER current, measured March 05

Again, the scale of the dependence on the HER beam is small relative to the dependence on the luminosity.
Another example for later reference: the outer forward endcap scaler rates as a function of PEP luminosity.
Sextant 1 barrel rates as a function of PEP luminosity

![Graph showing Sextant 1 barrel rates as a function of PEP luminosity]

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**Legend:**
- S1L01SUM
- S1L02SUM
- S1L03SUM
- S1L04SUM
- S1L06SUM
- S1L08SUM
- S1L10SUM
- S1L12SUM
- S1L14SUM
- S1L16SUM
- S1L17SUM
- S1L18SUM

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**Axes:**
- **X-axis:** PEPLUM
- **Y-axis:** Sextant Layer Sums (KHz)
Now go to the IFR response during the March 05 scans

Two representative barrel sextants, inner and outer forward endcaps
Background studies: HER x-angle

HER Single beam X-angle scan

Isttable_s1_s4_2007_03-05_1201_1834
Background studies: HER x-angle

HER Single beam X-angle scan

Isttable_s0-s5_2007_03-05_1201_1834

S3L01SUM
S3L02SUM
S3L03SUM
S3L04SUM
S3L06SUM
S3L08SUM
S3L09SUM
S3L10SUM
S3L12SUM
S3L14SUM
S3L16SUM
S3L17SUM
S3L18SUM

Sextant Layer Sums (kHz)

Barrel
Background studies: HER x-angle

HER Single beam X-angle scan

Layer 8 Sums
Layer 7 Sums
Layer 6 Sums
Layer 5 Sums
Layer 4 Sums
Layer 3 Sums
Layer 2 Sums
Layer 1 Sums

Layer Sums (Hz)

Layer 8 Sums
Layer 7 Sums
Layer 6 Sums
Layer 5 Sums
Layer 4 Sums
Layer 3 Sums
Layer 2 Sums
Layer 1 Sums

Inner Forward Endcap

HER_XANG
Background studies: HER x-angle

Layer 16 Sums
Layer 15 Sums
Layer 14 Sums
Layer 13 Sums
Layer 12 Sums
Layer 11 Sums
Layer 10 Sums
Layer 9 Sums

HER Single beam X-angle scan

Layer Sums (Hz)

Layer 16 Sums
Layer 15 Sums
Layer 14 Sums
Layer 13 Sums
Layer 12 Sums
Layer 11 Sums
Layer 10 Sums
Layer 9 Sums

Outermost Chambers

Outer Forward Endcap

HER_XANG

ifrtable_l16-l9_2007_03-05_1201_1834
Background studies: HER y-angle

HER Single beam Y-angle scan

Isttable_s1_s4_2007_03-05_1201_1834

Barrel
Background studies: HER y-angle

HER Single beam Y-angle scan

Isttable_s0-s5_2007_03-05_1201_1834

Barrel
Background studies: HER y-angle

HER Single beam Y-angle scan

Layer 8 Sums
Layer 7 Sums
Layer 6 Sums
Layer 5 Sums
Layer 4 Sums
Layer 3 Sums
Layer 2 Sums
Layer 1 Sums

Layer Sums (Hz)

Inner Forward Endcap

HER_YANG
Background studies: HER y-angle

Layer 16 Sums
Layer 15 Sums
Layer 14 Sums
Layer 13 Sums
Layer 12 Sums
Layer 11 Sums
Layer 10 Sums
Layer 9 Sums

HER Single beam Y-angle scan

Layer Sums (Hz)

Outer Forward Endcap
Background studies: LER x-angle

LER Single beam X-angle scan

S1L01SUM
S1L02SUM
S1L03SUM
S1L04SUM
S1L06SUM
S1L08SUM
S1L10SUM
S1L12SUM
S1L14SUM
S1L16SUM
S1L17SUM
S1L18SUM

Barrel
Background studies: LER x-angle
Background studies: LER x-angle

LER Single beam X-angle scan

Layer 8 Sums
Layer 7 Sums
Layer 6 Sums
Layer 5 Sums
Layer 4 Sums
Layer 3 Sums
Layer 2 Sums
Layer 1 Sums

Inner Forward Endcap
Background studies: LER x-angle

Layer 16 Sums
Layer 15 Sums
Layer 14 Sums
Layer 13 Sums
Layer 12 Sums
Layer 11 Sums
Layer 10 Sums
Layer 9 Sums

LER Single beam X-angle scan

LER_xangle

ifrtable_l16-l9_2007_03-05_1201_1834

Outer Forward Endcap
Background studies: LER y-angle

LER Single beam Y-angle scan

Barrel
Background studies: LER y-angle

LER Single beam Y-angle scan

Layer Sums (kHz)

Barrel

LER_YANG
Background studies: LER y-angle

LER Single beam Y-angle scan

Layer Sums (Hz)

Layer 8 Sums
Layer 7 Sums
Layer 6 Sums
Layer 5 Sums
Layer 4 Sums
Layer 3 Sums
Layer 2 Sums
Layer 1 Sums

Inner Forward Endcap
Background studies: LER $\gamma$-angle

LER Single beam $\gamma$-angle scan

Layer 16 Sums
Layer 15 Sums
Layer 14 Sums
Layer 13 Sums
Layer 12 Sums
Layer 11 Sums
Layer 10 Sums
Layer 9 Sums

Outer Forward Endcap
Background studies: vary LER current

<table>
<thead>
<tr>
<th>Layer Sums (kHz)</th>
<th>LERCUR</th>
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<tbody>
<tr>
<td>S1L01SUM</td>
<td></td>
</tr>
<tr>
<td>S1L02SUM</td>
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</tr>
</tbody>
</table>

**Barrel**
Background studies: vary LER current

Layer Sums (kHz)

LERCUR

Barrel
Background studies: vary LER current

Layer 8 Sums
Layer 7 Sums
Layer 6 Sums
Layer 5 Sums
Layer 4 Sums
Layer 3 Sums
Layer 2 Sums
Layer 1 Sums

LERCUR

Inner Forward Endcap
Background studies: vary LER current

Layer 16 Sums
Layer 15 Sums
Layer 14 Sums
Layer 13 Sums
Layer 12 Sums
Layer 11 Sums
Layer 10 Sums
Layer 9 Sums

LERCUR

Outer Forward Endcap
Background studies: vary HER current
Background studies: vary HER current

Barrel
Background studies: vary HER current

Inner Forward Endcap
Background studies: vary HER current

Layer 16 Sums
Layer 15 Sums
Layer 14 Sums
Layer 13 Sums
Layer 12 Sums
Layer 11 Sums
Layer 10 Sums
Layer 9 Sums

Layer Sums (Hz)

0 100 200 300 400 500 600 700 800

HERCUR

Outer Forward Endcap
Summary

- **Outer Forward Endcap Chambers**
  - Layers 16-15 are sensitive to variations in HER beam (angles, current)
    - Closest match to the shape of the HER x and y-angle plots is the DCH
  - Layers 16-15, and 14-15 are sensitive to variations in LER beam
    - Closest match to the HER x and y-angles are the DCH and the two forward neutron counters

- **Inner Forward Endcap Chambers**
  - Very weak dependence on LER, HER currents; maybe some dependence on the angles

- **Barrel Sextants**
  - Show dependence on variations in both HER and LER beams
  - Shape of the HER x and y-angle plots, like DIRC or EMC
  - LER x and y-angles, like DCH or DIRC