Run 5 Shielding Plans

Vince Cianciolo (ORNL)
Vasily Dzordzhadze (UT)
Yuri Efremenko (UT)
Ken Read (ORNL/UT)

June 22, 2004

Tunnel Shielding

- A specialized tunnel background simulation was developed using MARS and MCNPX. (MARS was used at Fermilab to guide D0's successful tunnel shielding effort.)
- These simulations and measurements were used to develop the Run 4 tunnel shielding, compare the benefits of multiple shielding scenarios, and provide guidance in developing new shielding schemes.
- Feasibility, time, and cost have also affected the design and implementation.
- Much of this has been previously reported (including a poster at QM04).

Tunnel Shielding

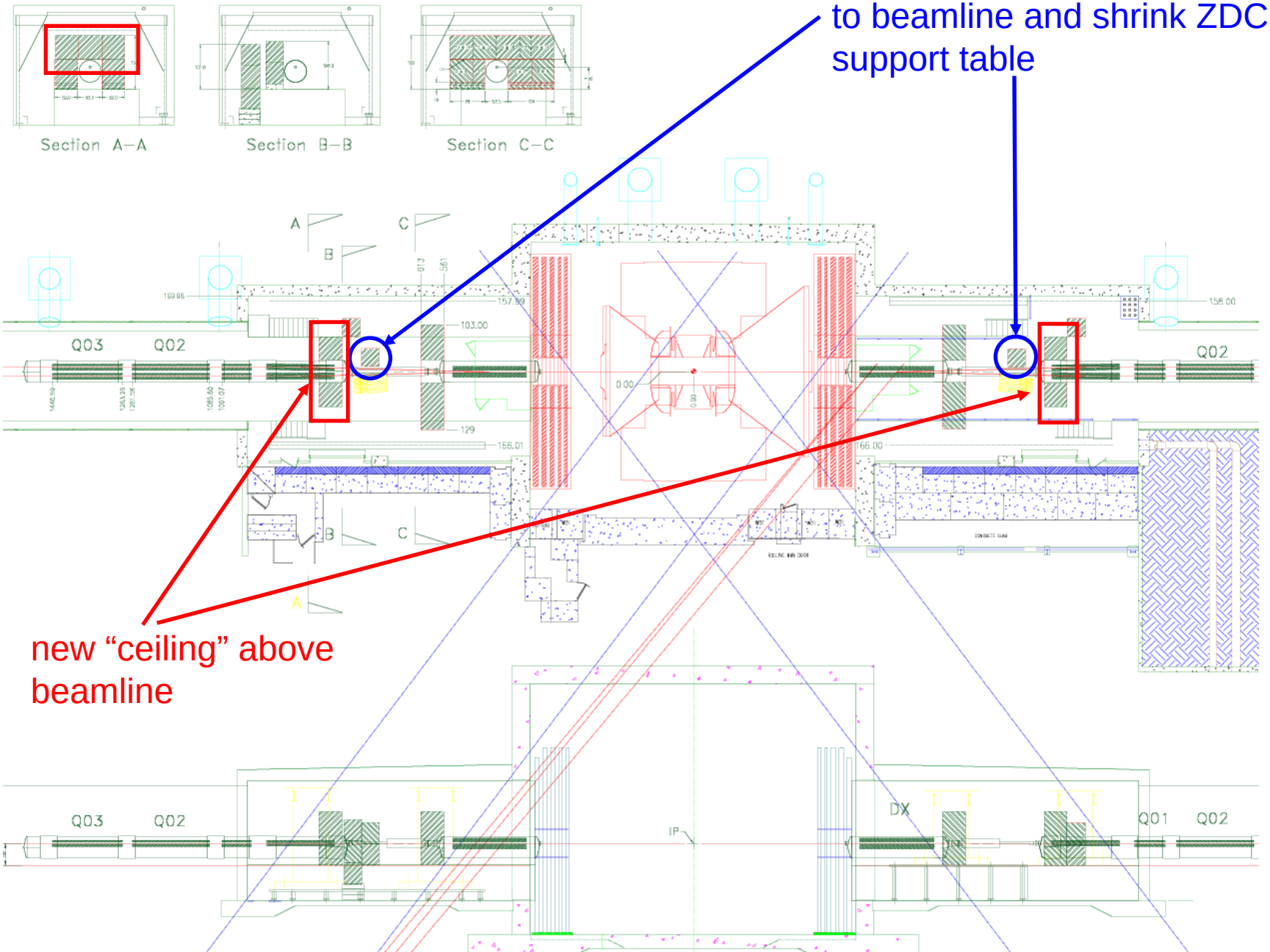
- Improved shielding, collimation, and automated stearing made a big difference for Run 4.
- Many discussions with RHIC experts concerning observed backgrounds and likely scenarios for where beam is scraping.
- The Run 4 shielding scheme will be further improved for Run 5.
- In this talk:
  - Drawings to show existing and planned shielding.
  - Data used to provide guidance for the Run 5 modifications.

Observations from Run 4 p+p

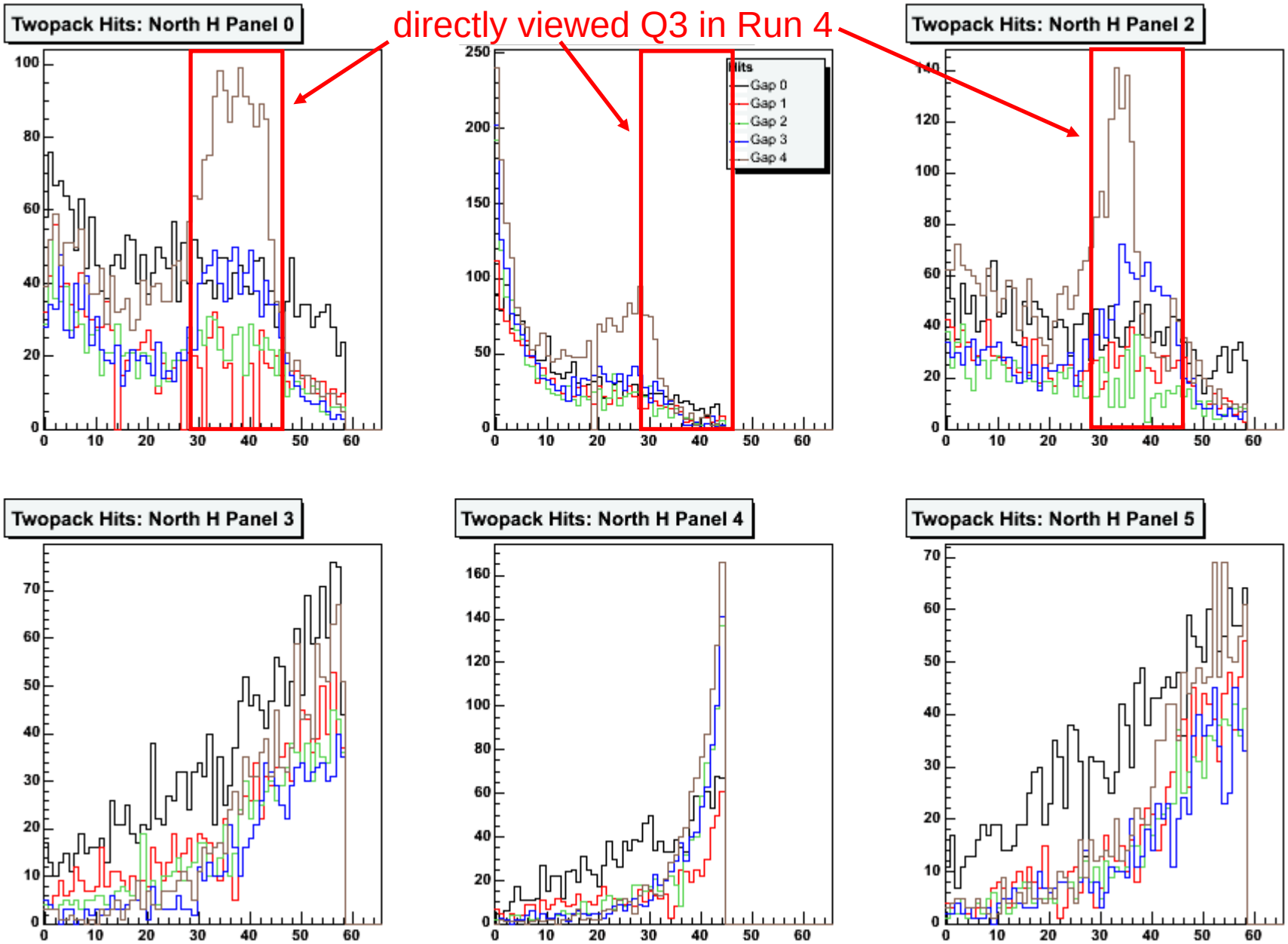
- Important news: The Run 4 pp data indicate that raising the height of the tunnel shielding will shield a number of tubes which directly viewed Q3.
- Q3 has long been suspected to be the most likely primary scraping site because the aperture is smallest at Q3 and the beam is largest there.
- A plan is in place to raise the shielding height this summer to fix this.

Observations from Run 4 Au+Au

- The picture is more complicated for AuAu. We can accommodate the observed background topology as well as expectations concerning likely scraping sites if the Au ions do first scrape at Q3 but a fraction of the fragments continue on very close to the beam line, interacting and scattering along the way, sometimes near D0 and DX, for instance.
- This is the reason for the extra shielding near D0, as close to the beam line as possible.
- Again, feasibility plays a big role in the planning.


move shielding tower closer to beamline and shrink ZDC support table
new “ceiling” above beamline
Section A–A
Section B–B
Section C–C
Q03
Q02
Q01
DX
IP
A
B
C
157.59
158.00
166.01
166.00
103.00
129
0.00

these horizontal tubes
directly viewed Q3 in Run 4



Overview

- Expect improved tunnel shielding performance for Run 5
- We really appreciate Charlie Pearson's tremendous help!
- We continue to study the issue.