The magnetized shield wall has three purposes:

1. Limit dose rates near IP2 when IP1 has beam (and vice versa).

2. Protect the occupants of the IR hall from an errant beam in the "worst case" accident when the beam containment devices have failed.

3. Reduce the muon background in the detectors.

* See FNAL Note, FN-0790-AD, "Machine-Related Backgrounds in the SiD Detector at ILC", July 2006, for a recent study using two magnetized walls.

Muon Dose Rates in IR2 when IR1 has Beam

L. Keller
Jan. 2005

Dose rate goal is <0.05 mRem/hr

Shielding Condition	500 GeV CM (mRem/hr)	1 TeV CM (mRem/hr)
No shielding	0.9	1.5
18 m steel walls	0.03	0.12
5 m magnetic spoilers	<0.01	0.04

- **Collimate 0.1% halo**
- **All sources, both beams**

Muons in the ILC Detector from PC3

L. Keller
Feb. 2006
Rev. Aug. 2006

Conditions:

1. Muon source is PC-3 in the betatron collimation section, 1225 m from the IP
   estimate about 15% of the muons reaching the detector come from this source
   so multiply numbers in the Table by about SIX to include all sources

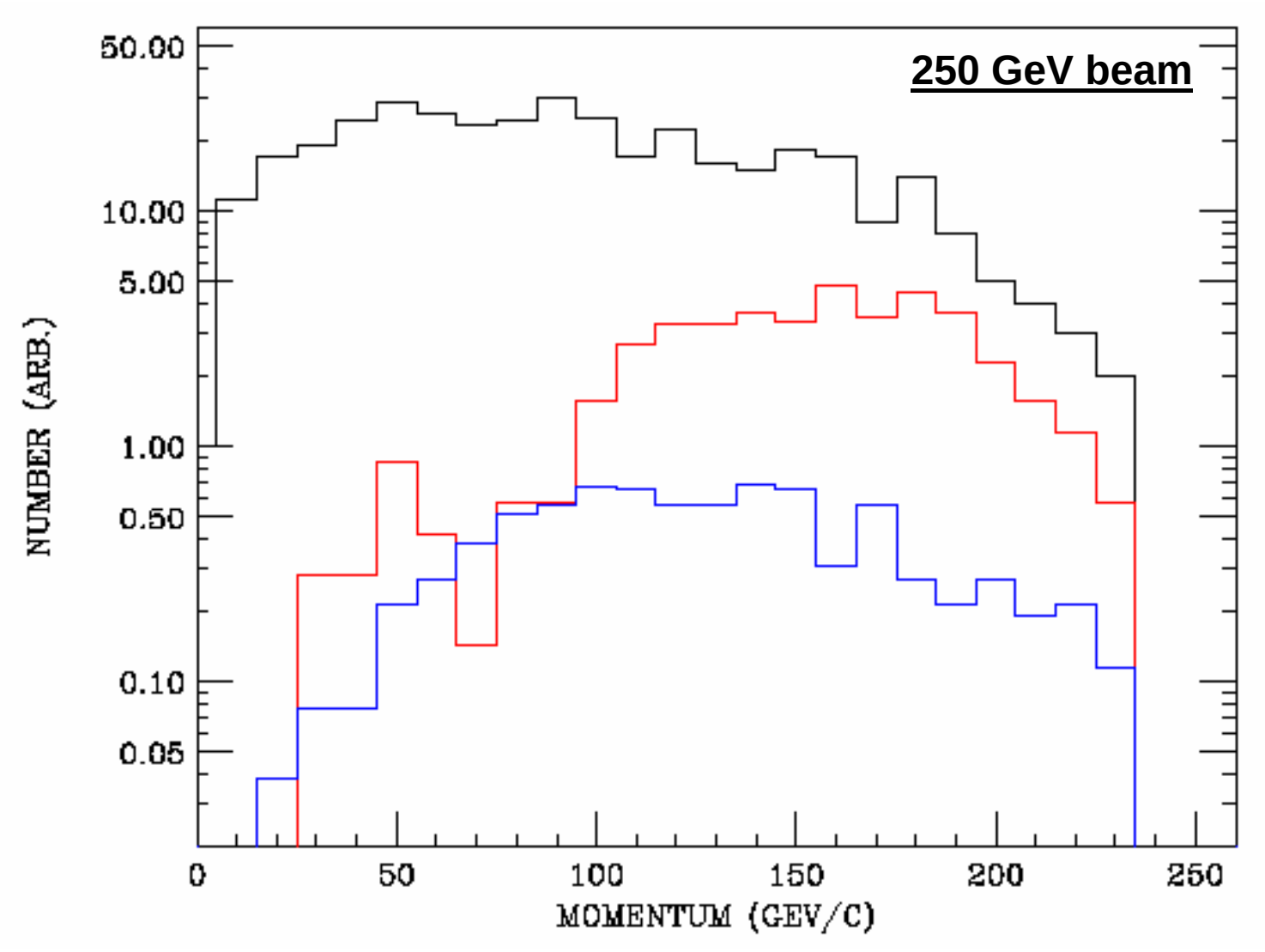
2. Tunnel-filling wall at Z = 321 m from the IP, no other spoilers present

3. beam loss = 0.1%, include muons from both sides

4. 4.5 m diameter tunnel, 3.0 m wide floor, beam 75 cm above floor, 100 cm from wall,

Magnetic Spoiler Condition	250 GeV beam Detector 6.5 m radius per bunch	250 GeV beam TPC 2.5 m radius per 200 bunches	500 GeV beam Detector 6.5 m radius per bunch	500 GeV beam TPC 2.5 m radius per 200 bunches	Scale to NLC for comparison 500 GeV beam Detector 6.5 m radius per train	Scale to NLC for comparison 500 GeV beam TPC 2.5 m radius per train
no spoiler	12	1276	33	3045	2310	1065
5 m	1.7	64	12	536	840	188
18 m	0.23	24	1.6	122	110	43

Muon Source Momenta from PC-3 Hitting 6.5 m Detector

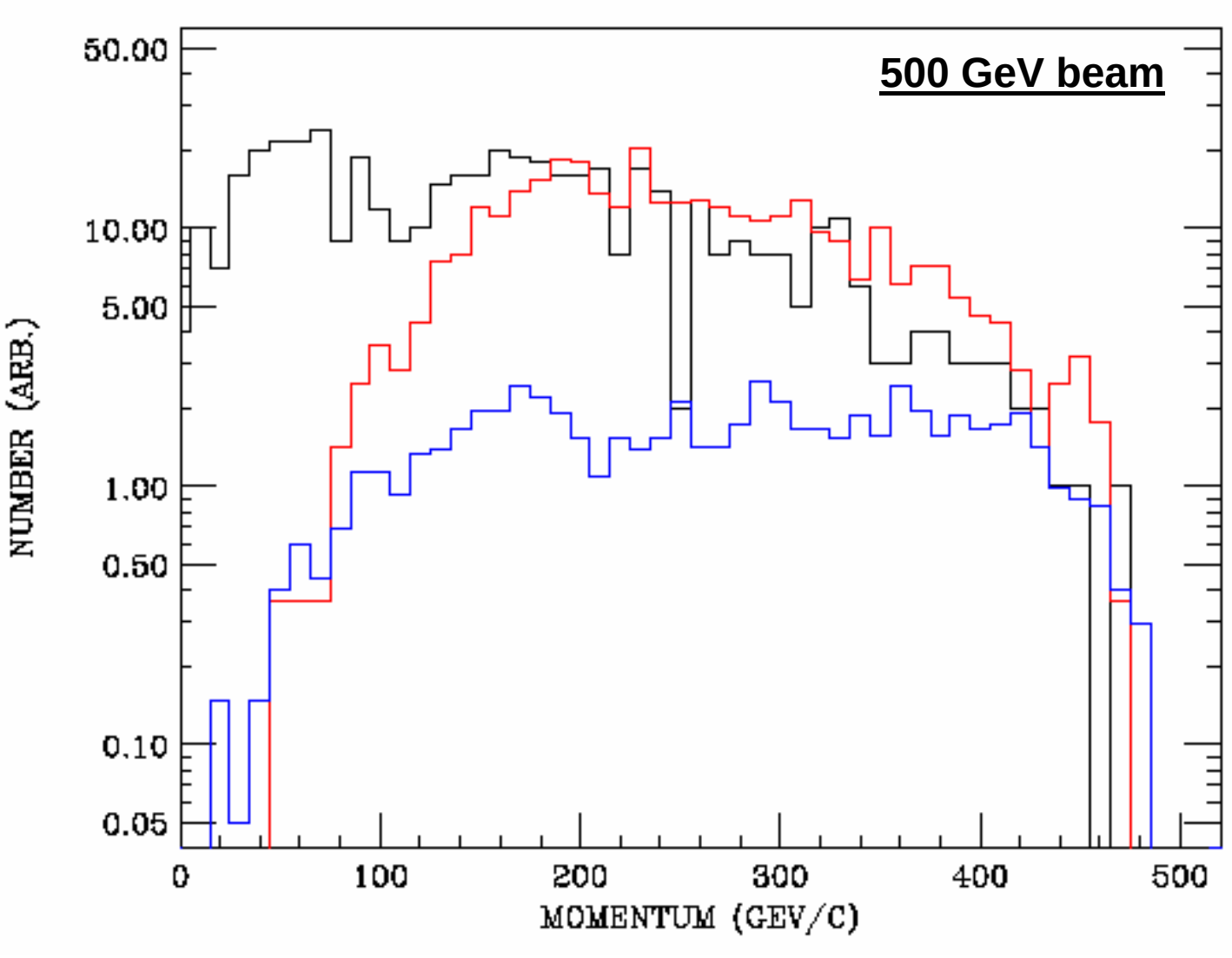


No magnetic wall

5 m tunnel-filling magnetic wall at Z = 321 m from the IP

18 m tunnel-filling magnetic wall at Z = 321 m from the IP

Muon Source Momenta from PC-3 Hitting 6.5 m Detector



No magnetic wall

5 m tunnel-filling magnetic wall at Z = 321 m from the IP

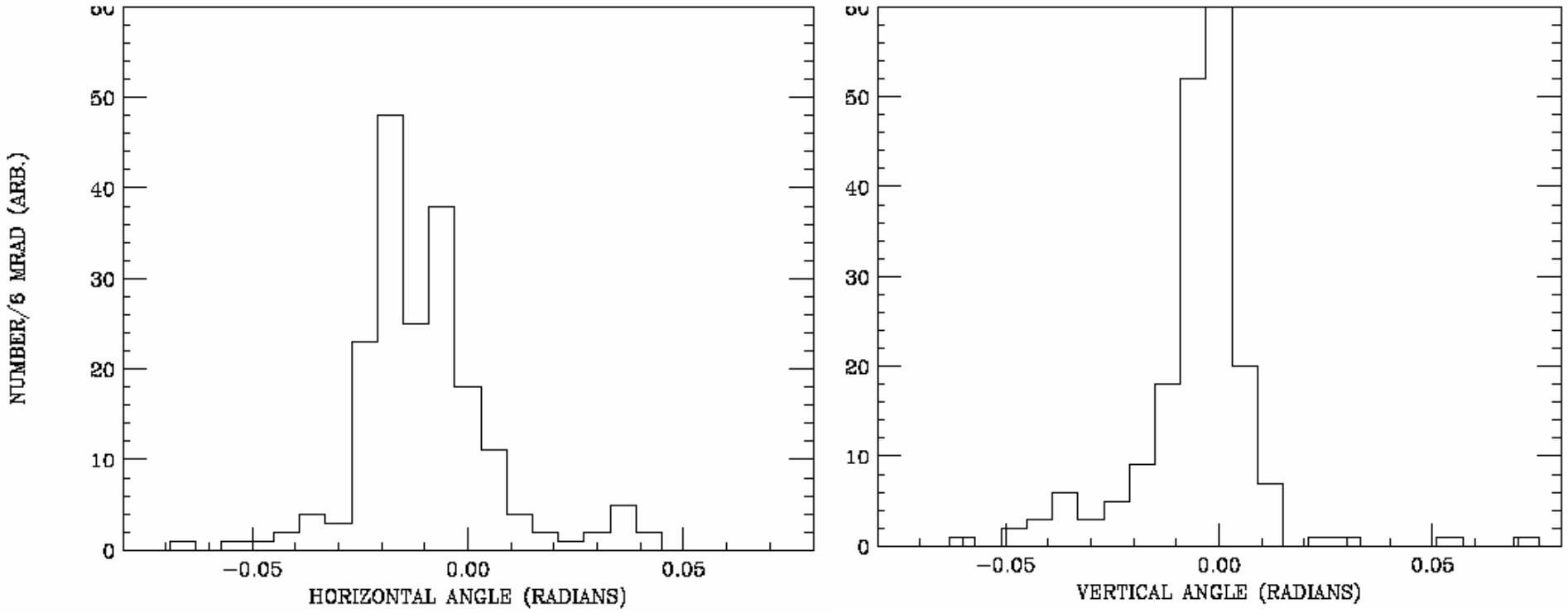
18 m tunnel-filling magnetic wall at Z = 321 m from the IP

Horizontal and Vertical Angles of Muons in the TPC

Include radial field in detector endcap

5 m magnetized wall at Z = 321 m from IP

E_beam = 250 GeV



Momentum Spectrum of Muons in the TPC