Status of the "Noise vs Muon" Studies

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Position of the window for digital filtering wrt shaping function maximum

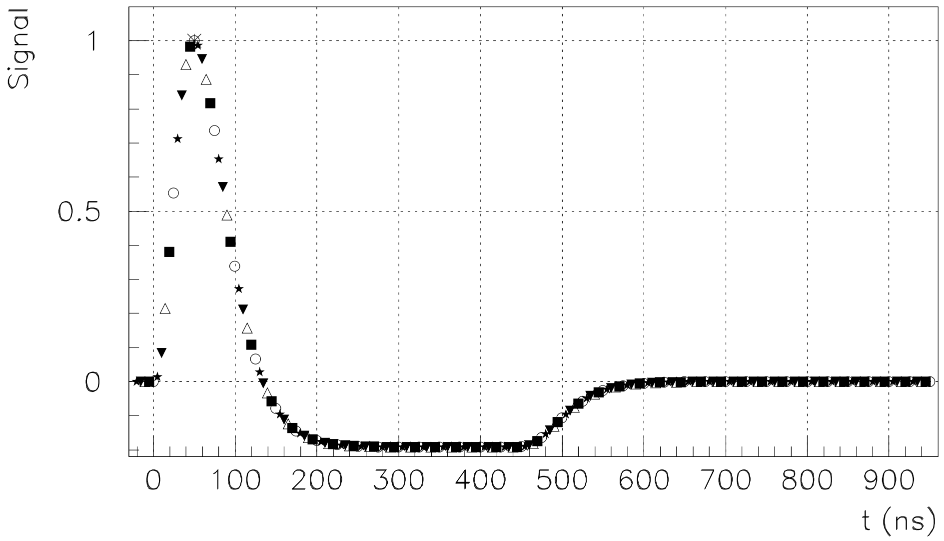
- **Electronic noise, shaping and auto-correlation functions (L. Kurchaninov and D. Salihagić)**
- **2872 minimum bias events (simulated in 1997):**
  - **high luminosity** $L = 10^{34} cm^{-2} s^{-1}$ $(< N_{mb} >= 23)$
  - **low luminosity** $L = 10^{33} cm^{-2} s^{-1}$ $(< N_{mb} >= 2.3)$
  - **very low luminosity** $L = 10^{32} cm^{-2} s^{-1}$ $(< N_{mb} >= 0.23)$
- **Digital filtering with 5 time slices:**
  - $t_P = 50$ **ns, every time slice**
  - $t_P = 100$ **ns, every time slice**
  - $t_P = 100$ **ns, every second time slice**

Muon signal and underlying events

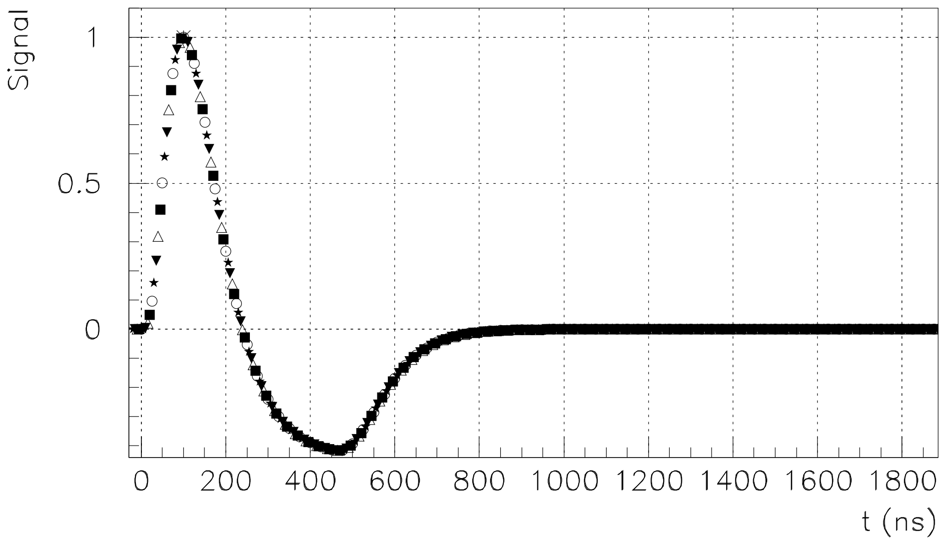
- **10 000 muons with 1.6** $< \eta <$ **2.5**
- **23 minimum bias events in the same bunch-crossing**

Next step: full muon reconstruction with noise

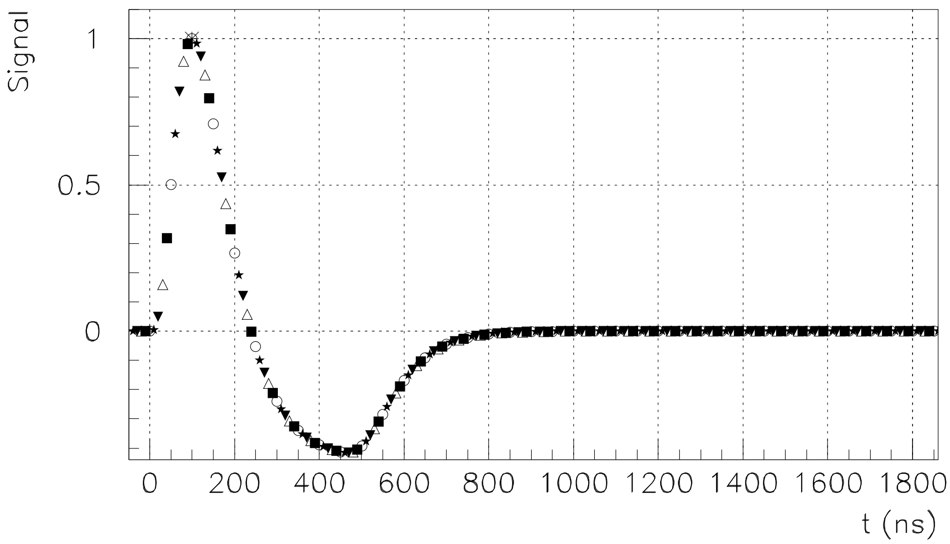
Shaping Functions



t_P=50 ns, t_{MAX}=49.8 ns (every slice)

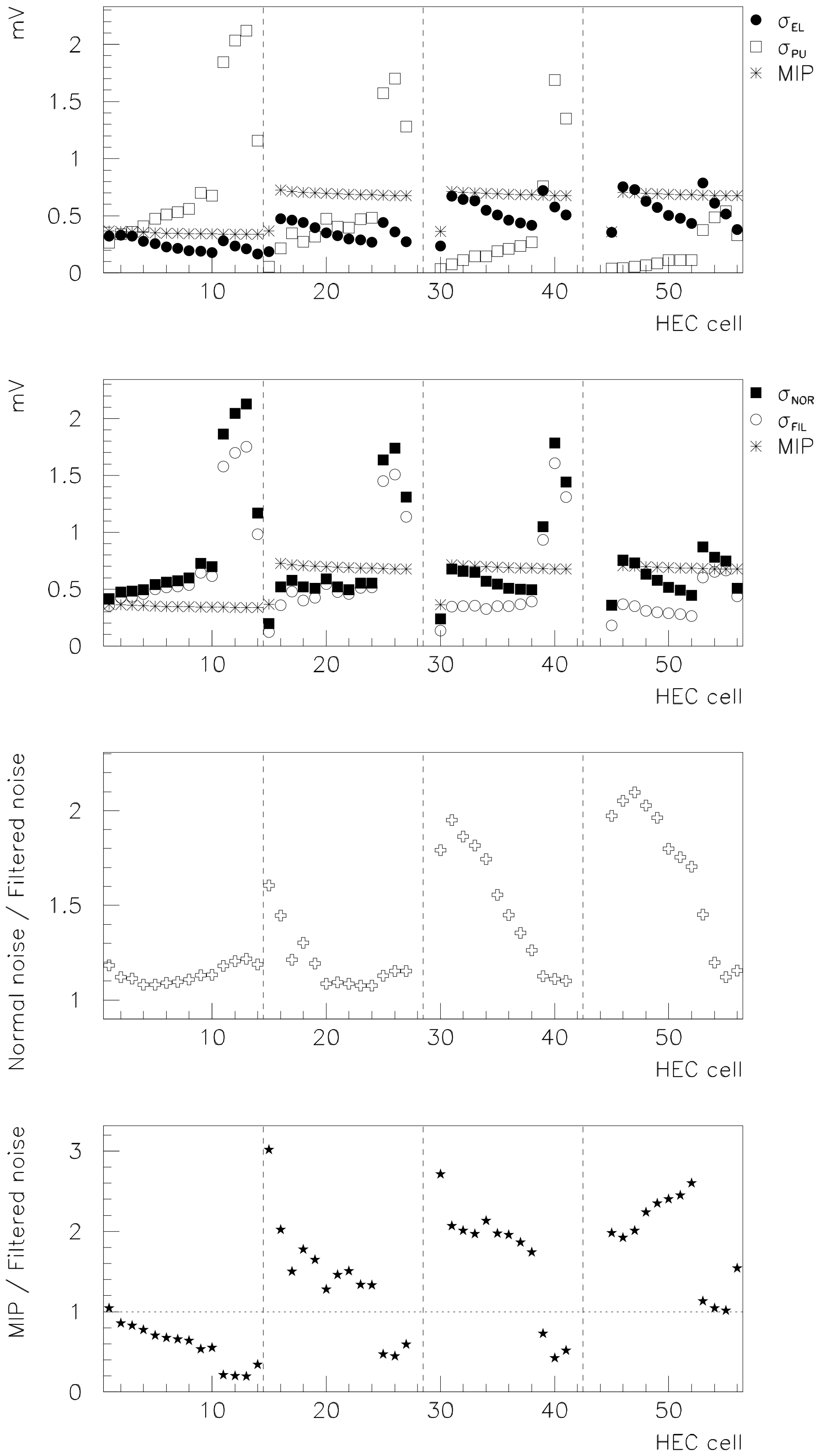


t_P=100 ns, t_{MAX}=100.1 ns (every slice)

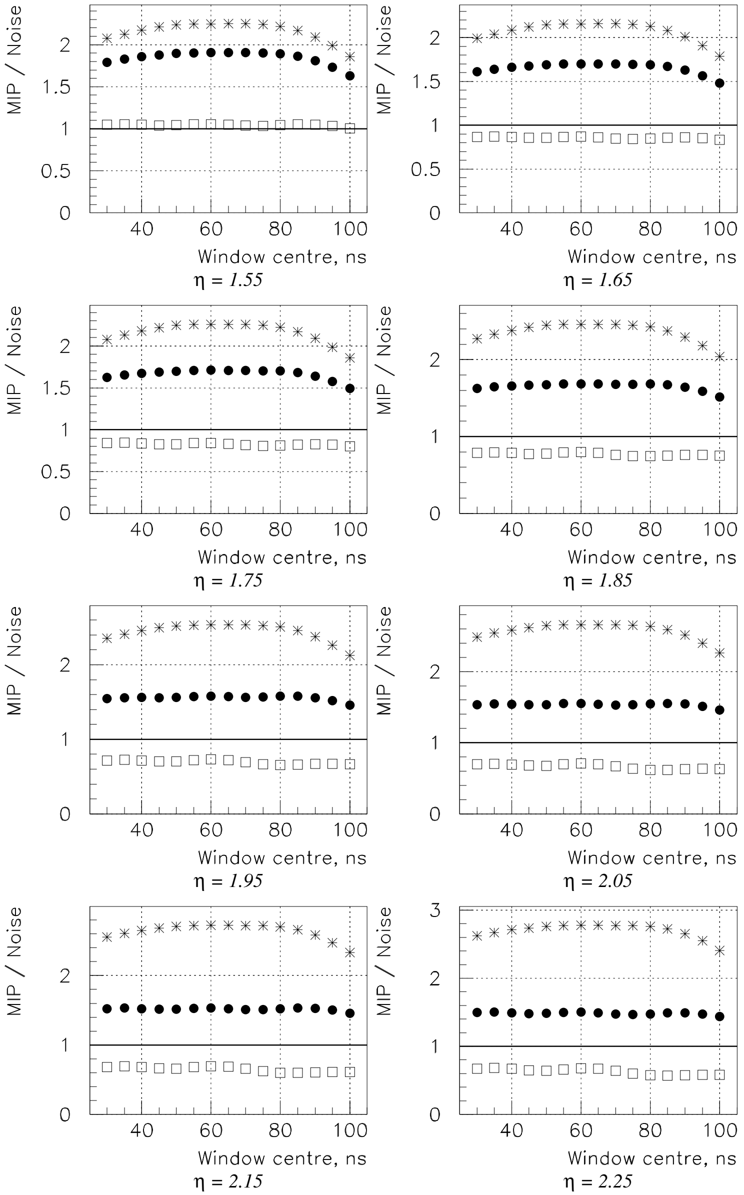


t_P=100 ns, t_{MAX}=100.1 ns (every second slice)

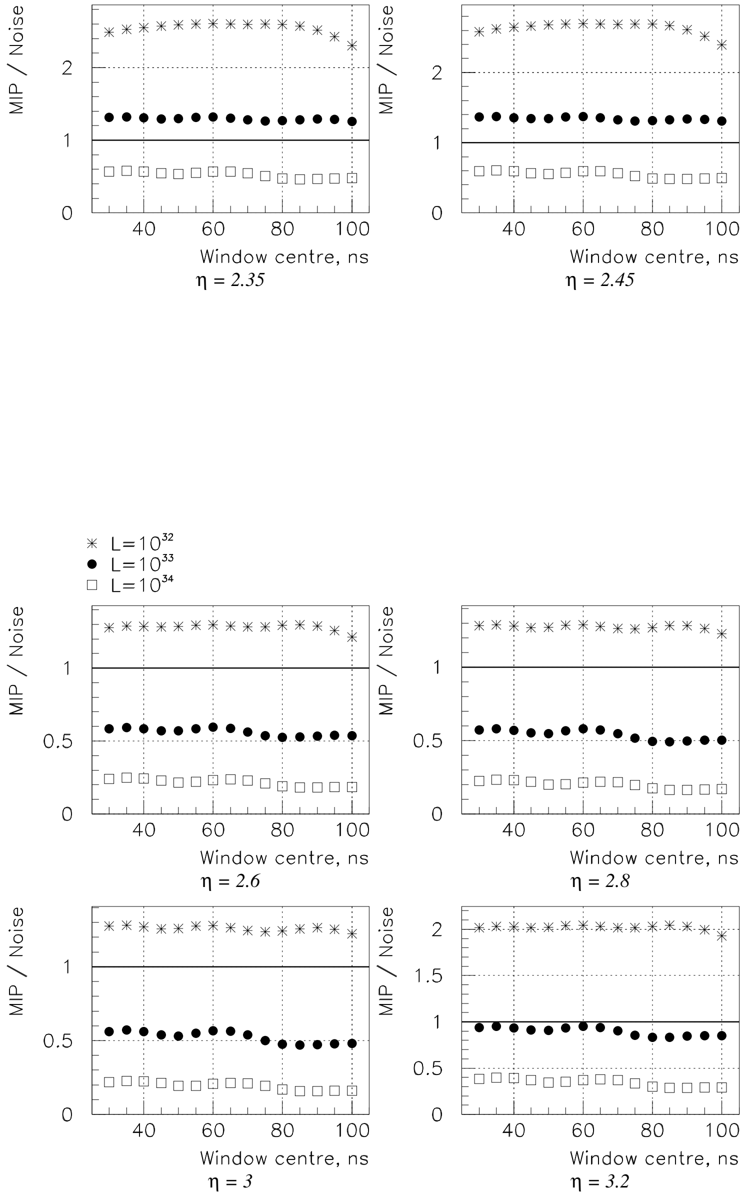
$<N_{MB}>=23$, $t_P=50$ ns, Every Slice, Window no.5



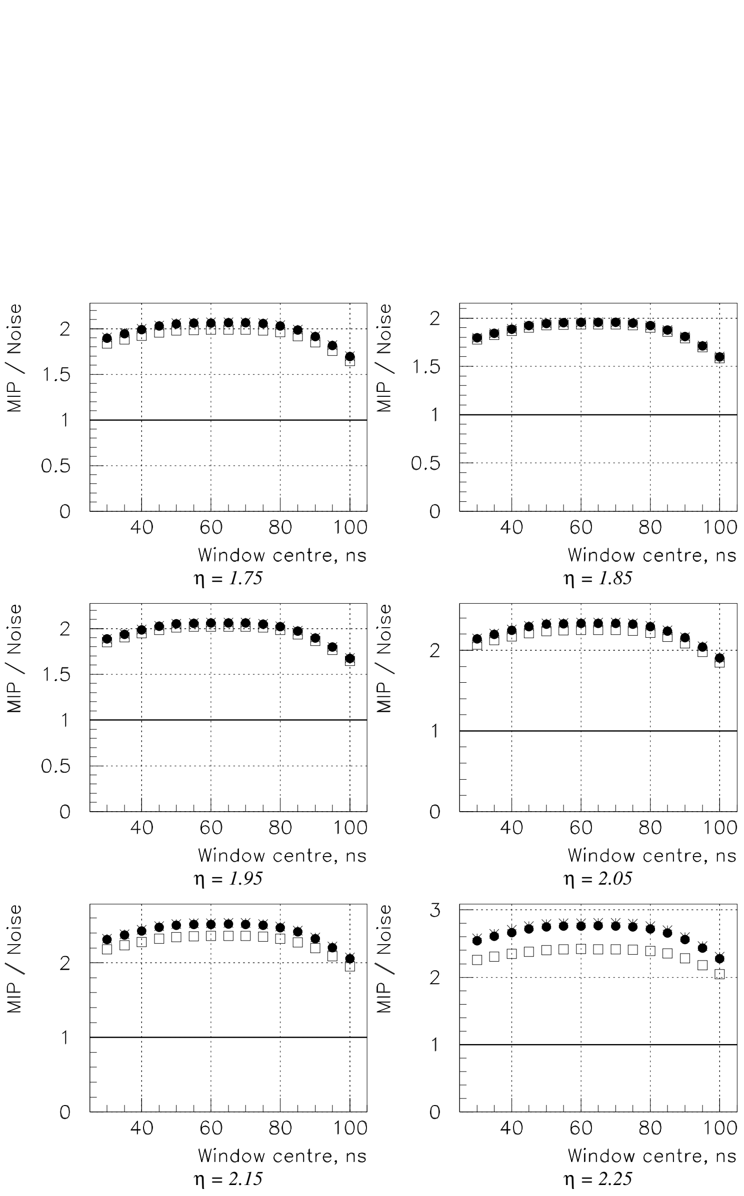
t_P=50 ns, Every Slice, HEC Compartment 1



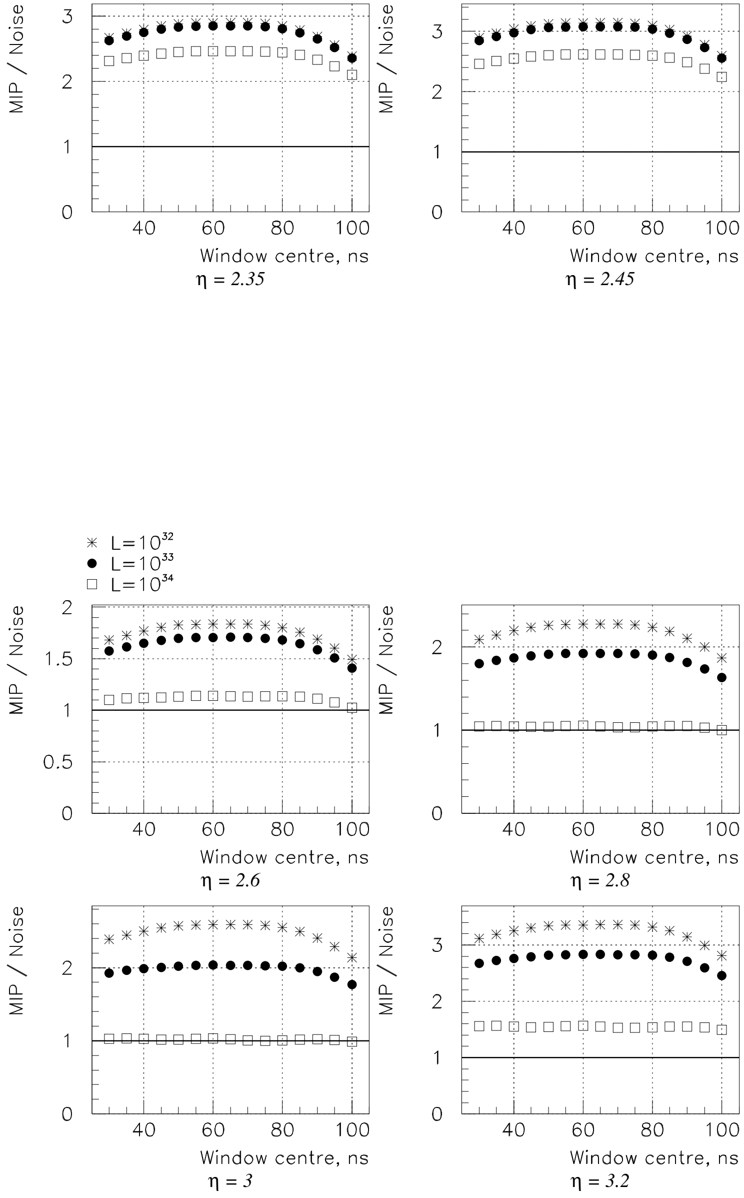
t_P=50 ns, Every Slice, HEC Compartment 1



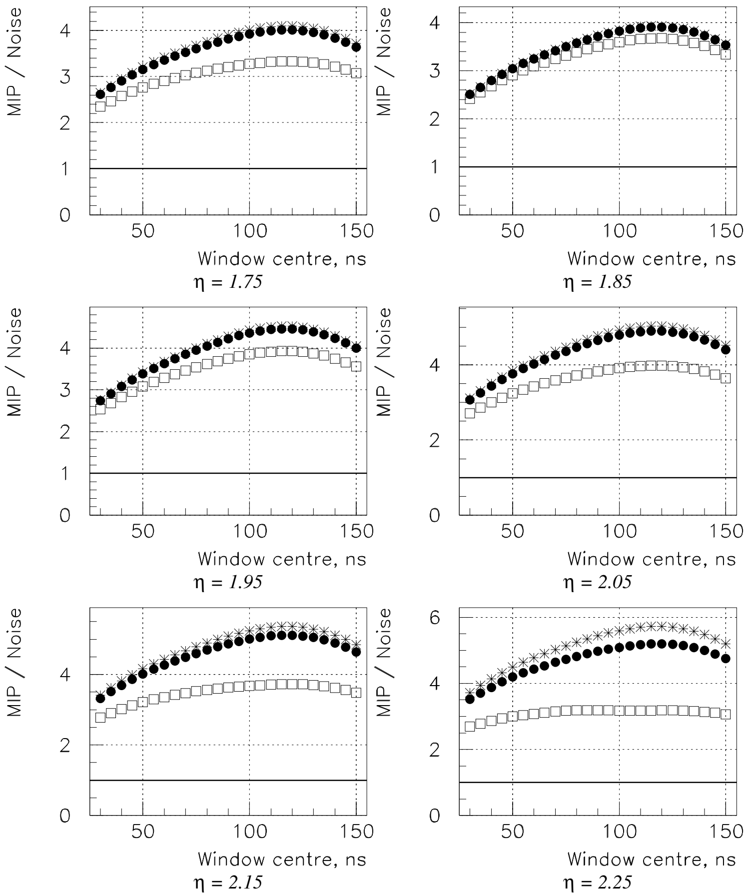
t_P=50 ns, Every Slice, HEC Compartment 4



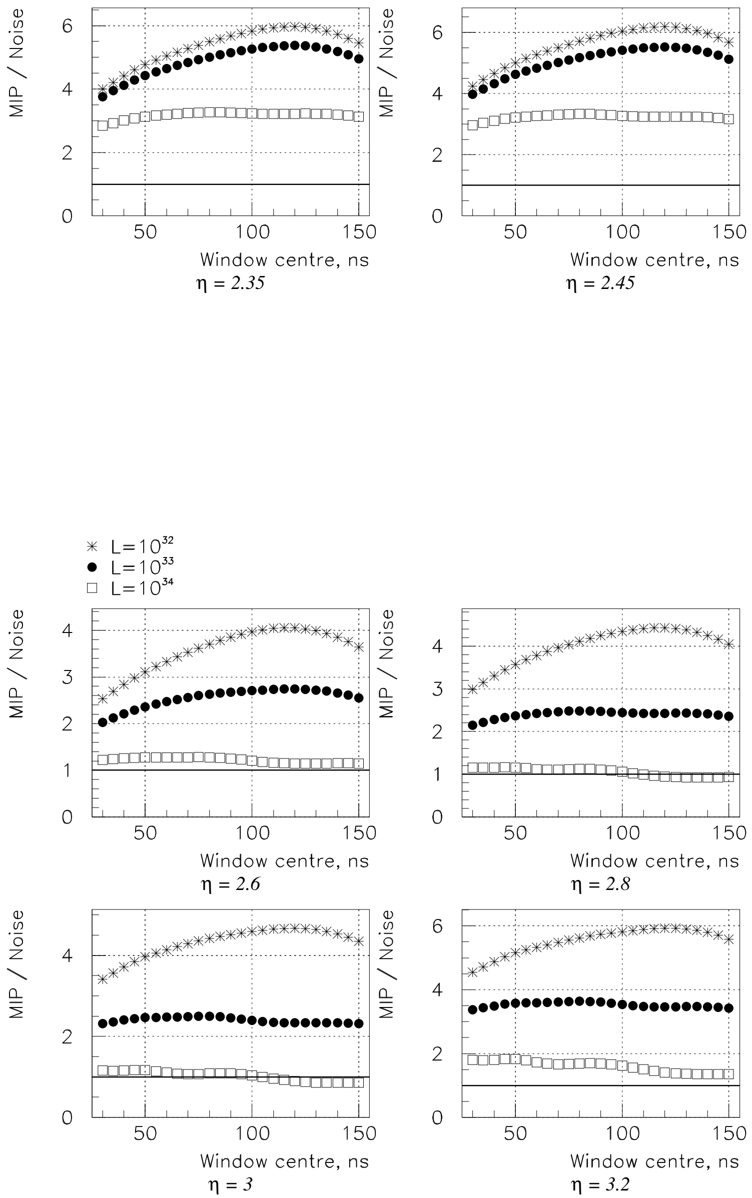
t_P=50 ns, Every Slice, HEC Compartment 4



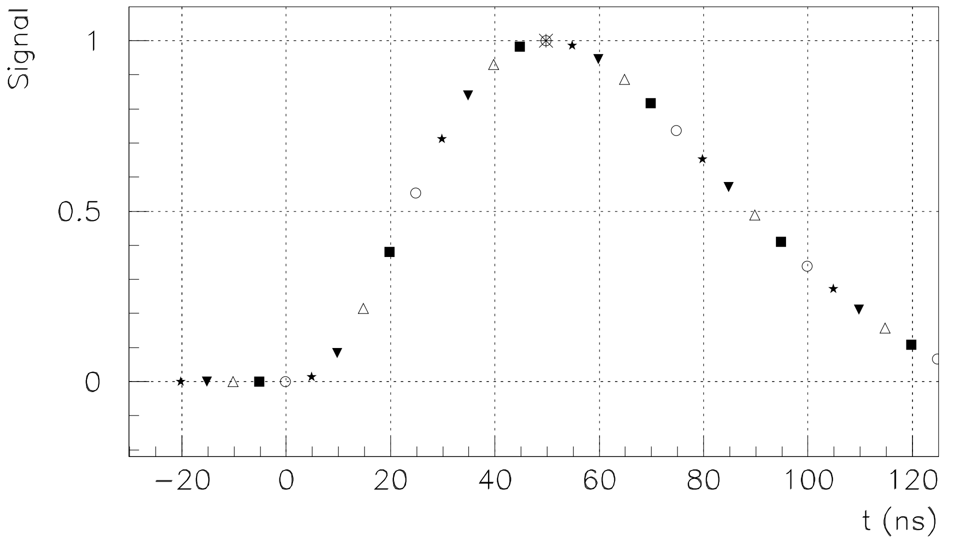
t_P=100 ns, Every Slice, HEC Compartment 4



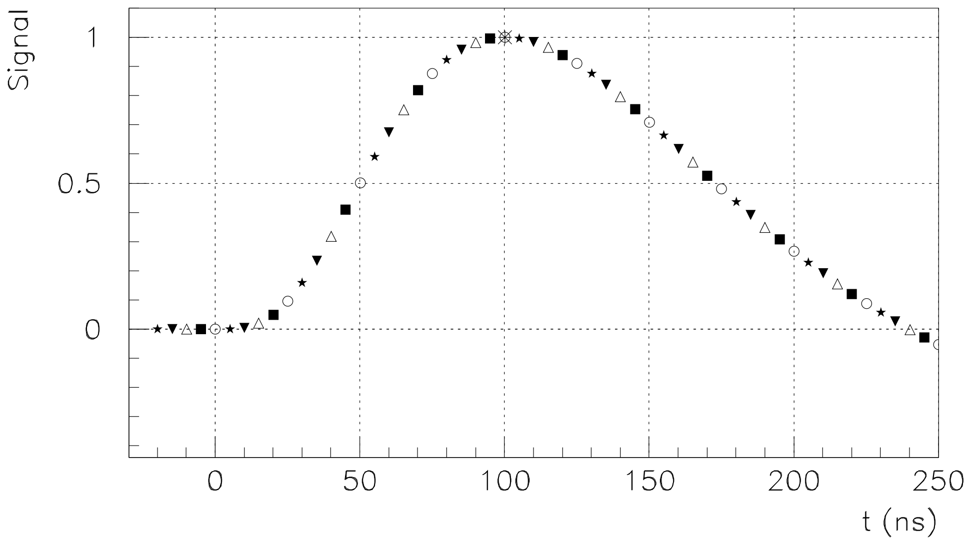
t_P=100 ns, Every Slice, HEC Compartment 4



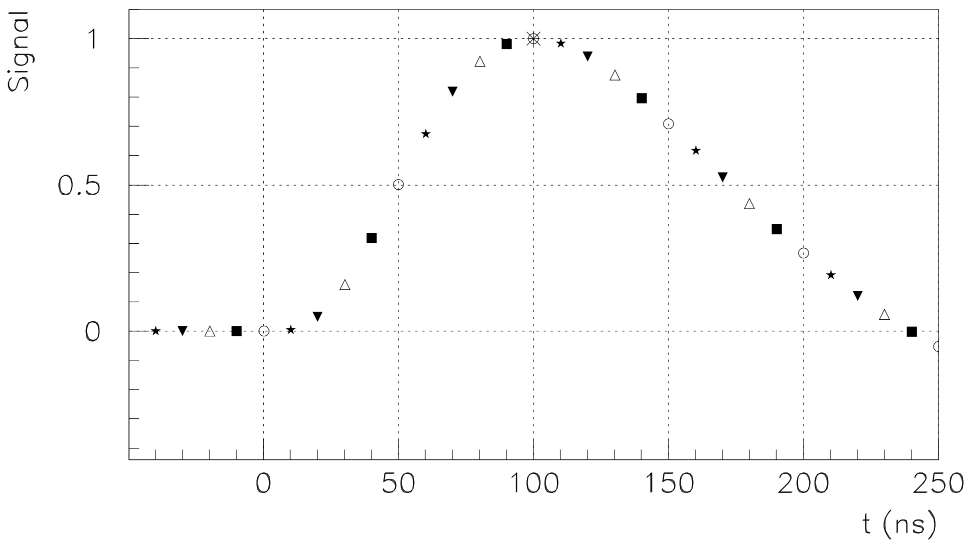
Shaping Functions



t_P=50 ns, t_{MAX}=49.8 ns (every slice)

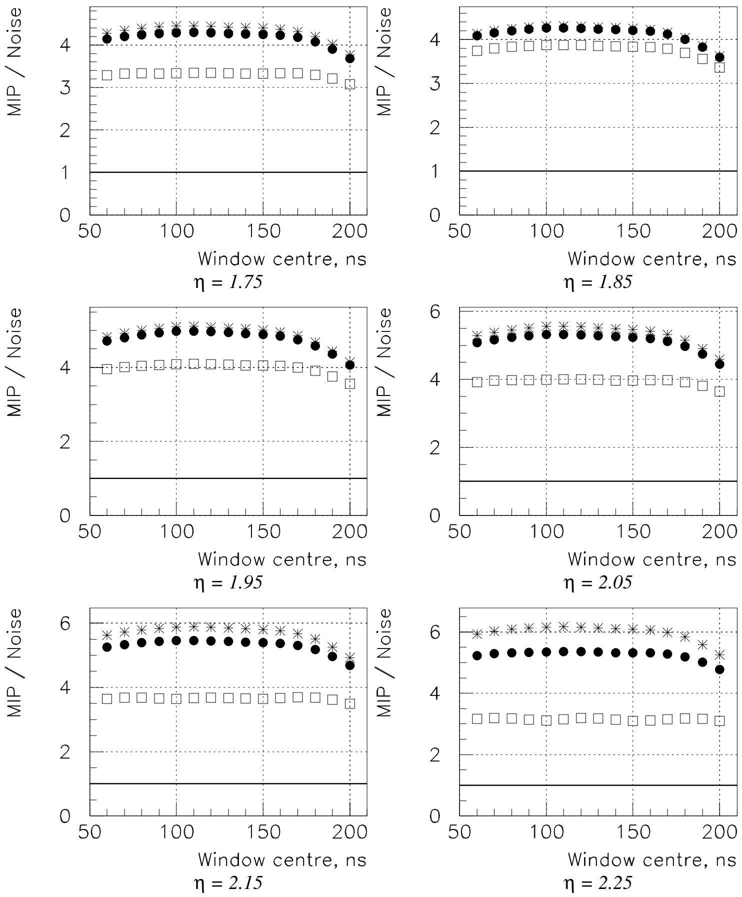


t_P=100 ns, t_{MAX}=100.1 ns (every slice)

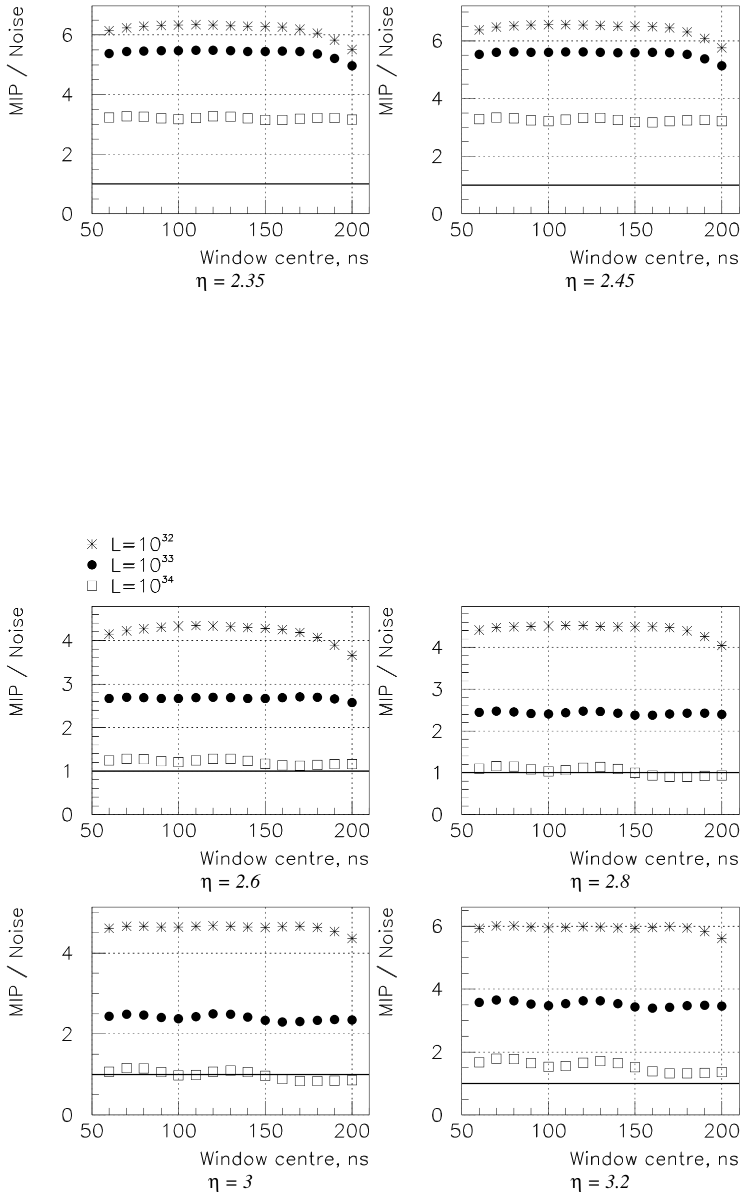


t_P=100 ns, t_{MAX}=100.1 ns (every second slice)

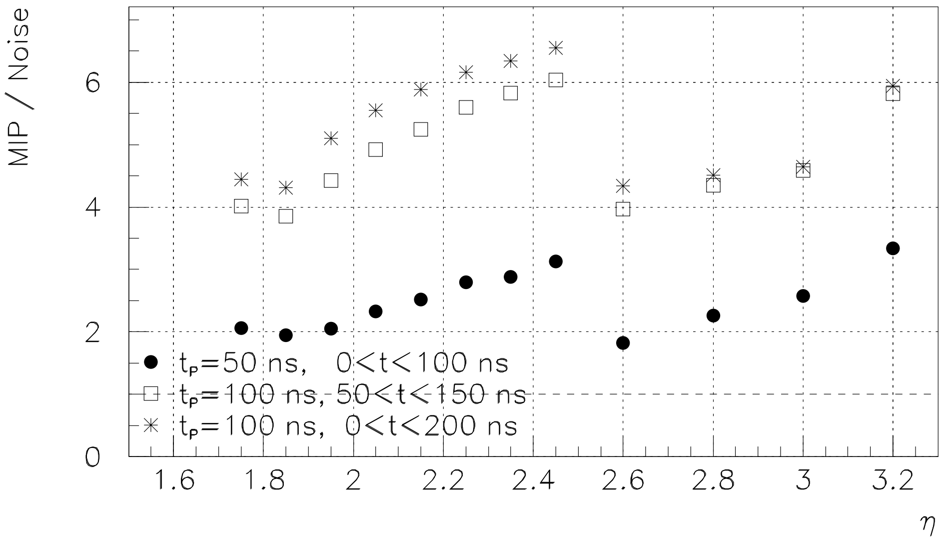
t_P=100 ns, Every Second Slice, HEC Compartment 4



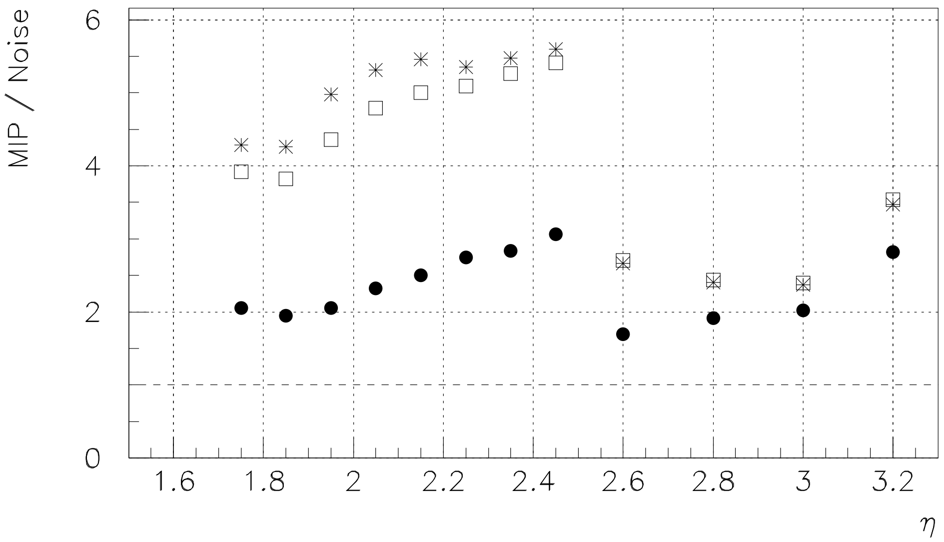
t_P=100 ns, Every Second Slice, HEC Compartment 4



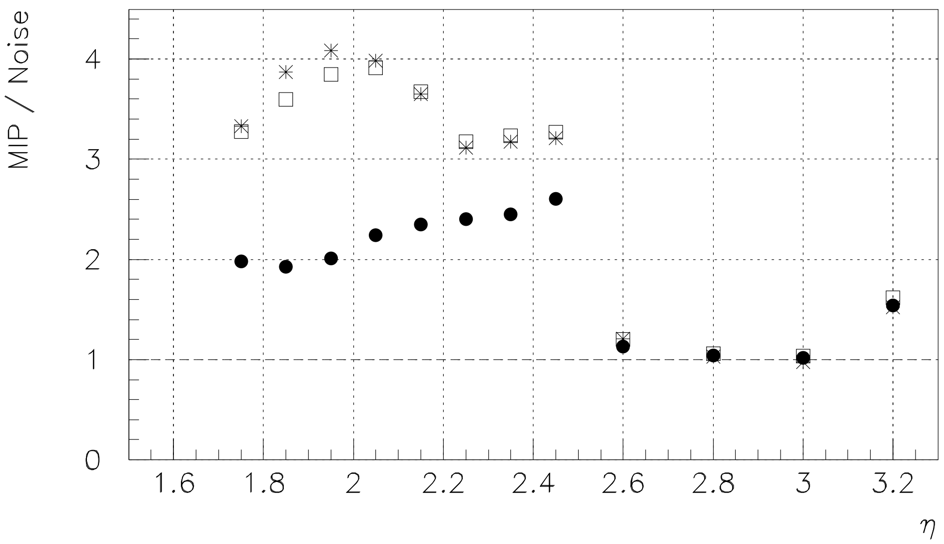
Five Time Slice Weighting for the Fourth HEC Compartment



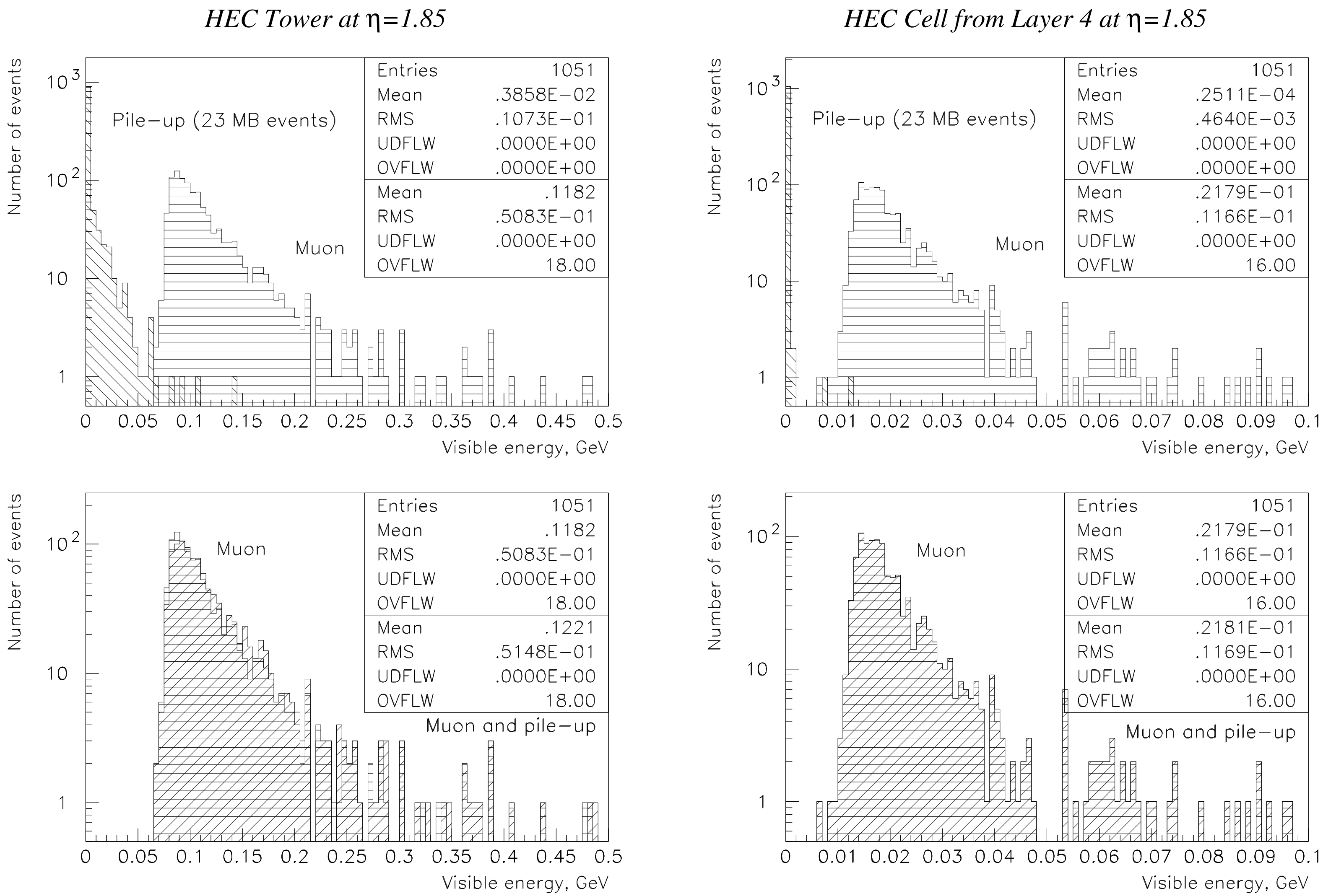
$\langle N_{MB}\rangle$=0.23



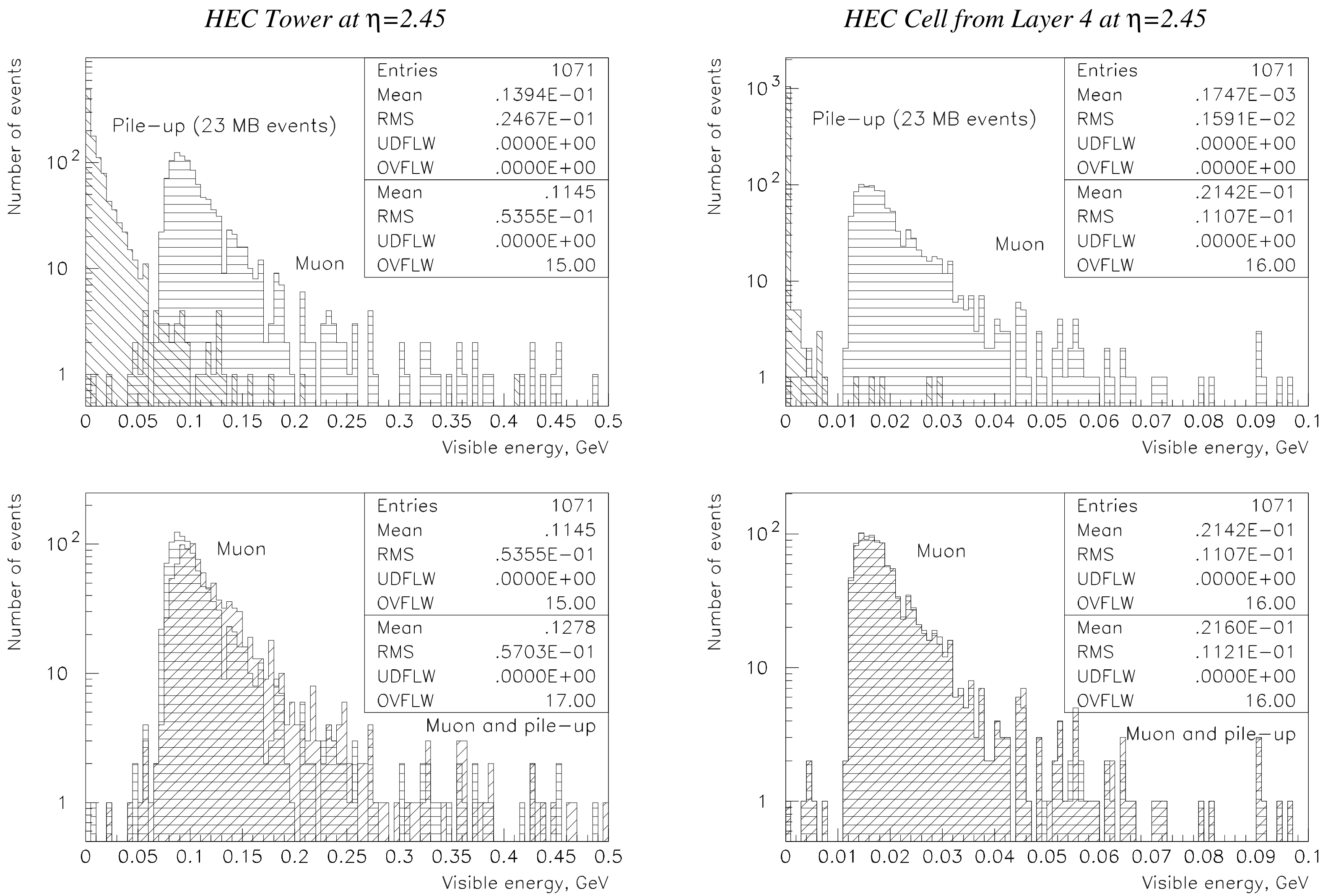
$\langle N_{MB}\rangle$=2.3



$\langle N_{MB}\rangle$=23



HEC Tower at η=1.85
HEC Cell from Layer 4 at η=1.85
Pile-up (23 MB events)
Muon
Muon and pile-up
Number of events
Visible energy, GeV
Entries 1051
Mean .3858E-02
RMS .1073E-01
UDFLW .0000E+00
OVFLW .0000E+00
Mean .1182
RMS .5083E-01
UDFLW .0000E+00
OVFLW 18.00
Mean .2511E-04
RMS .4640E-03
Mean .2179E-01
RMS .1166E-01
OVFLW 16.00
Mean .1221
RMS .5148E-01
Mean .2181E-01
RMS .1169E-01


HEC Tower at η=2.45
HEC Cell from Layer 4 at η=2.45
Entries 1071
Mean .1394E−01
RMS .2467E−01
UDFLW .0000E+00
OVFLW .0000E+00
Mean .1145
RMS .5355E−01
UDFLW .0000E+00
OVFLW 15.00
Pile−up (23 MB events)
Muon
Entries 1071
Mean .1747E−03
RMS .1591E−02
UDFLW .0000E+00
OVFLW .0000E+00
Mean .2142E−01
RMS .1107E−01
UDFLW .0000E+00
OVFLW 16.00
Pile−up (23 MB events)
Muon
Entries 1071
Mean .1145
RMS .5355E−01
UDFLW .0000E+00
OVFLW 15.00
Mean .1278
RMS .5703E−01
UDFLW .0000E+00
OVFLW 17.00
Muon
Muon and pile−up
Entries 1071
Mean .2142E−01
RMS .1107E−01
UDFLW .0000E+00
OVFLW 16.00
Mean .2160E−01
RMS .1121E−01
UDFLW .0000E+00
OVFLW 16.00
Muon
Muon and pile−up
Number of events
Visible energy, GeV