Comparison muon testbeam data with MC

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Data

Apr. runs:
7230-7234 (Can. module, about 10K
muon triggers and .2K random triggers)
7228,7223,7214,7220,7236 and 7237
(Eur. module)

Aug. runs:
Muon runs from 8122 to 8130
(about 10K events+10K random events,
about 90% MWPC efficiency, only Can. module)
Muon runs from 8098 to 8109 (not used)
(10K events, 5% random events,
about 40% MWPC efficiency, only Can. module)

MC:
120GeV (point I,D about 2700 events)
(point E about 18000 events)
20GeV (point D about 2700 events)

Calculation procedures

Pedestals - mean value of 3d sample
for muon and random triggers separately
Muon signal trig mu
Noise trig random

One method of signal reconstraction
Cleland's method (optimal filter)
for 5 samples
files: for Aug. runs
dig weights amp 981014.dat
dig weighte tim 981014.dat
for Apr. runs
the same with date 980414

Calibration:
file "coeff dig 981014.dat"
and the same with date 980414

MC data with real noise
Evis(nA)=Evis(GeV)*C(nA/GeV)

Calculation of the sampling fraction
for muon MC data
S=Edep/Evis is sampling fraction
Edep=E0-Eleak=Eabs+Evis
For 1+2 segments we have
Evis(1+2s)=Evis*(1+2)/(1+2+2)
Eabs(1+2s)=(Edep-Evis)*(1+2)/(1+2+2*2)
S(1+2s)=(Eabs(1+2s)+Evis(1+2s))/Evis(1+2s)
S(3s)=...

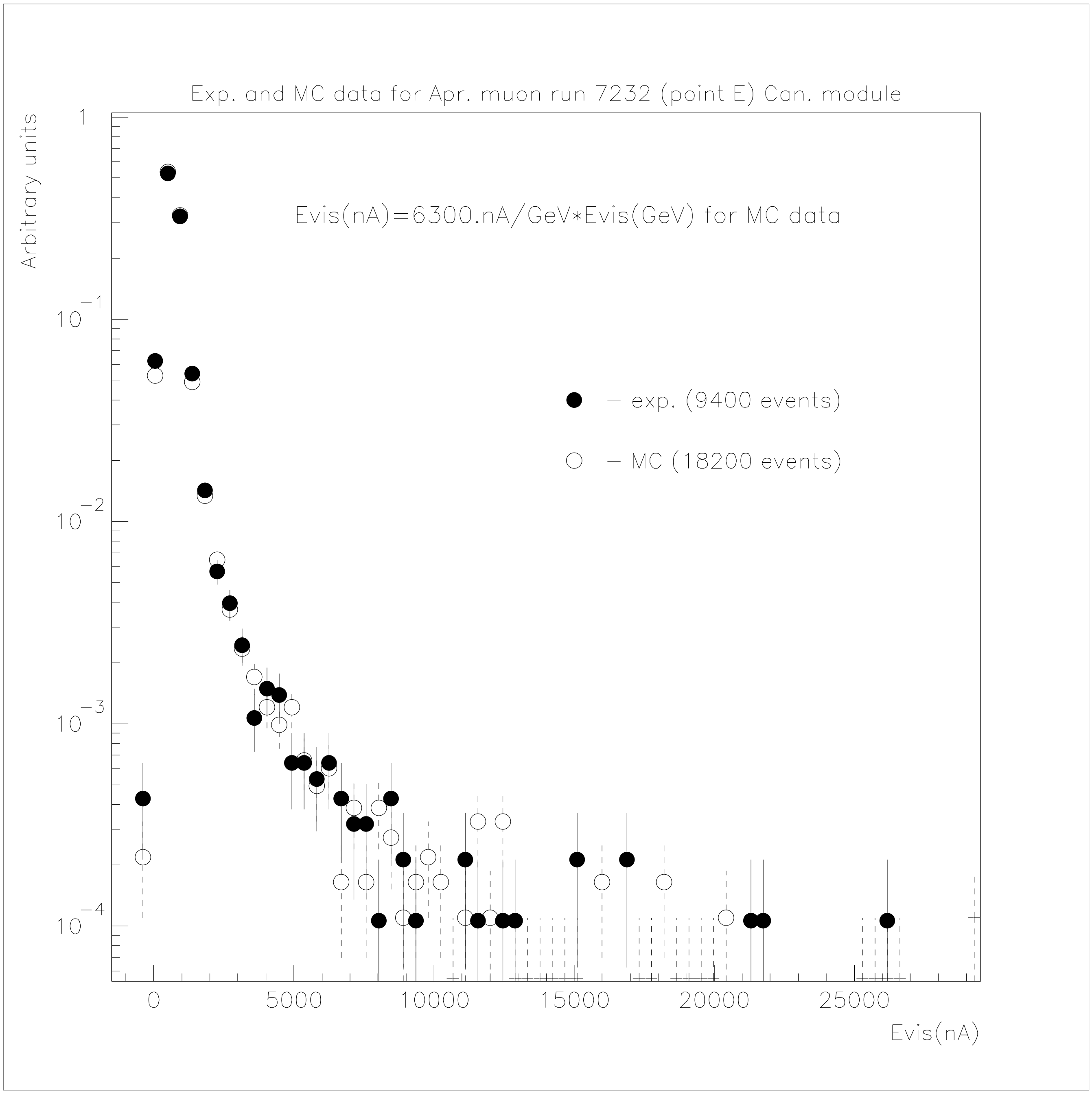
Calculation e/muon120GeV
for MC:
e/muon(MC)=S(1+2s)muon/S(1+2s)electron
S(1+2s)electron=23.3
for experimental data:
e/muon(exp.)=(e/muon(MC))*Cmuon/Celectron

Results

- (Fig. 1,2) different coefficients C
for different segments and for
different runs
- (Fig.3) comparison with MC for point E
coefficint C=(6300+-150)nA/GeV for all segments
- on the average coefficient C for April
for muons (6300+-150)nA/GeV
for elect 7258nA/GeV
- the same coefficints for August
for muons (6140+-150)nA/GeV
for elect 7400nA/GeV
- (Fig.4,5) sampling fraction for segments 1,2
and for segment 3 for MC 120GeV
and 20GeV muon data
- e/muon(MC)=.990+-.003 (.979+-.003 when we
use
Evis(2s)/Evis(1s)=2.2 (instead 2))
- e/muon(exp.)=.86+-.03(for April) ???
=.82+-.03(for August)???
- sampling fraction for MIP
Evis(one gap)=1.68MeV
(2.11(MeV/cm)*4*.199cm)
Eabs(2.5cm Cu)=31.36MeV
(12.54(MeV/cm)*2.5cm)
S(MIP)=19.7 (19.8)
muon/MIP=.85 (.86) for MC data

Conclusions and plans

- Coefficient C=(6300+-150)nA/GeV for visible energy of muon 120 GeV signal gives good agreement between experemental and MC data
- The comparison of these coefficients for muon and electron data gives very strange result. May be the reason is the unlenearity of the hardware calibration.
- Sampling fraction for 120GeV muon is equal 23.07+-.03 for segments 1 and 2 and 45.13+-.05 for segment 3.
- e/muon ratio for MC data is equal .990+-.003
- e/muon ratio for exp. data is equal .86+-.03 for April runs and .82+-.03 for August runs
value for experemental data.
- muon/MIP ratio for MC data is equal .85



Exp. and MC data for Apr. muon run 7232 (point E) Can. module
Arbitrary units
Evis(nA)=6300.nA/GeV*Evis(GeV) for MC data
– exp. (9400 events)
– MC (18200 events)
Evis(nA)

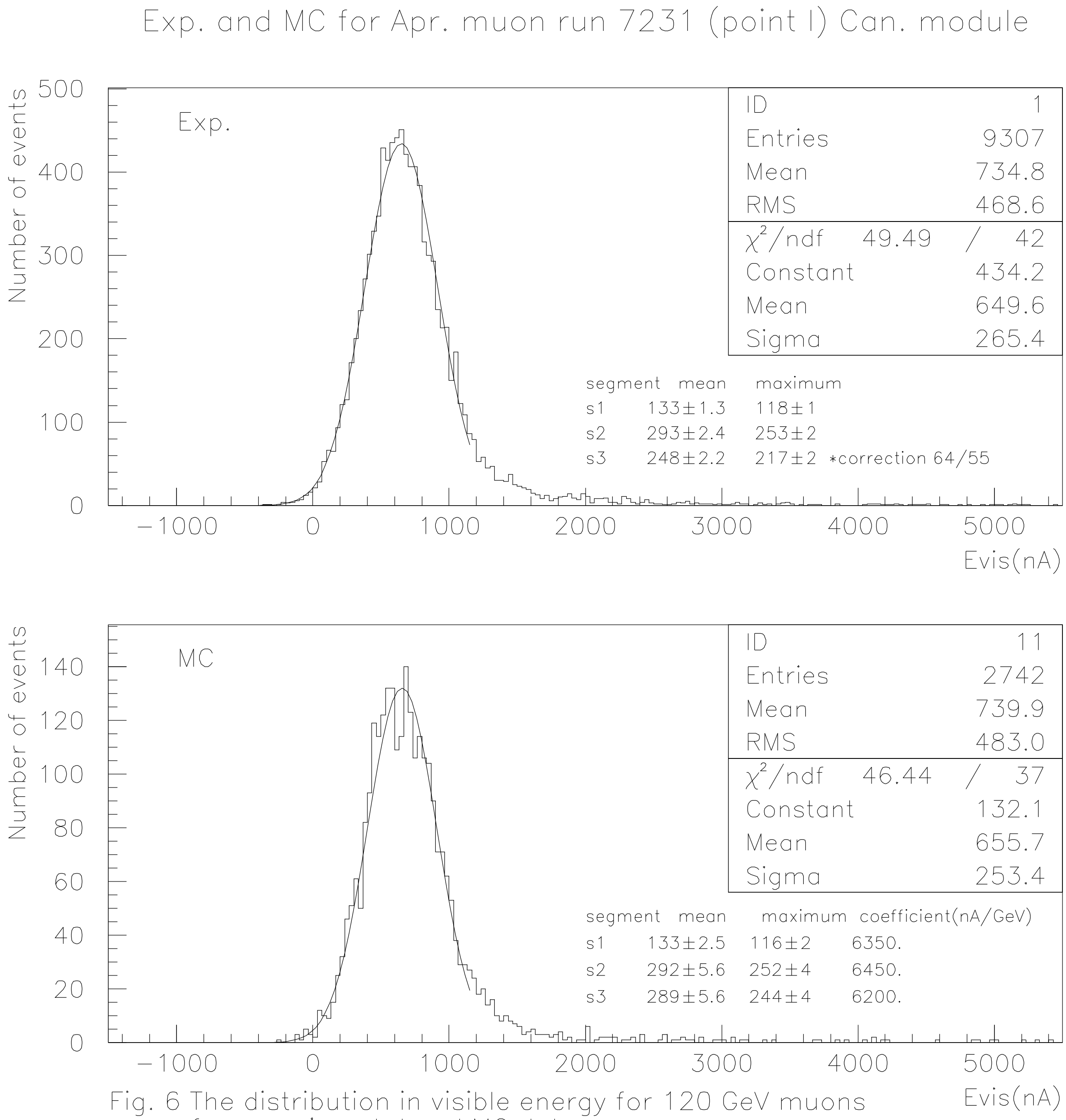


Fig. 6 The distribution in visible energy for 120 GeV muons for experimental and MC data.

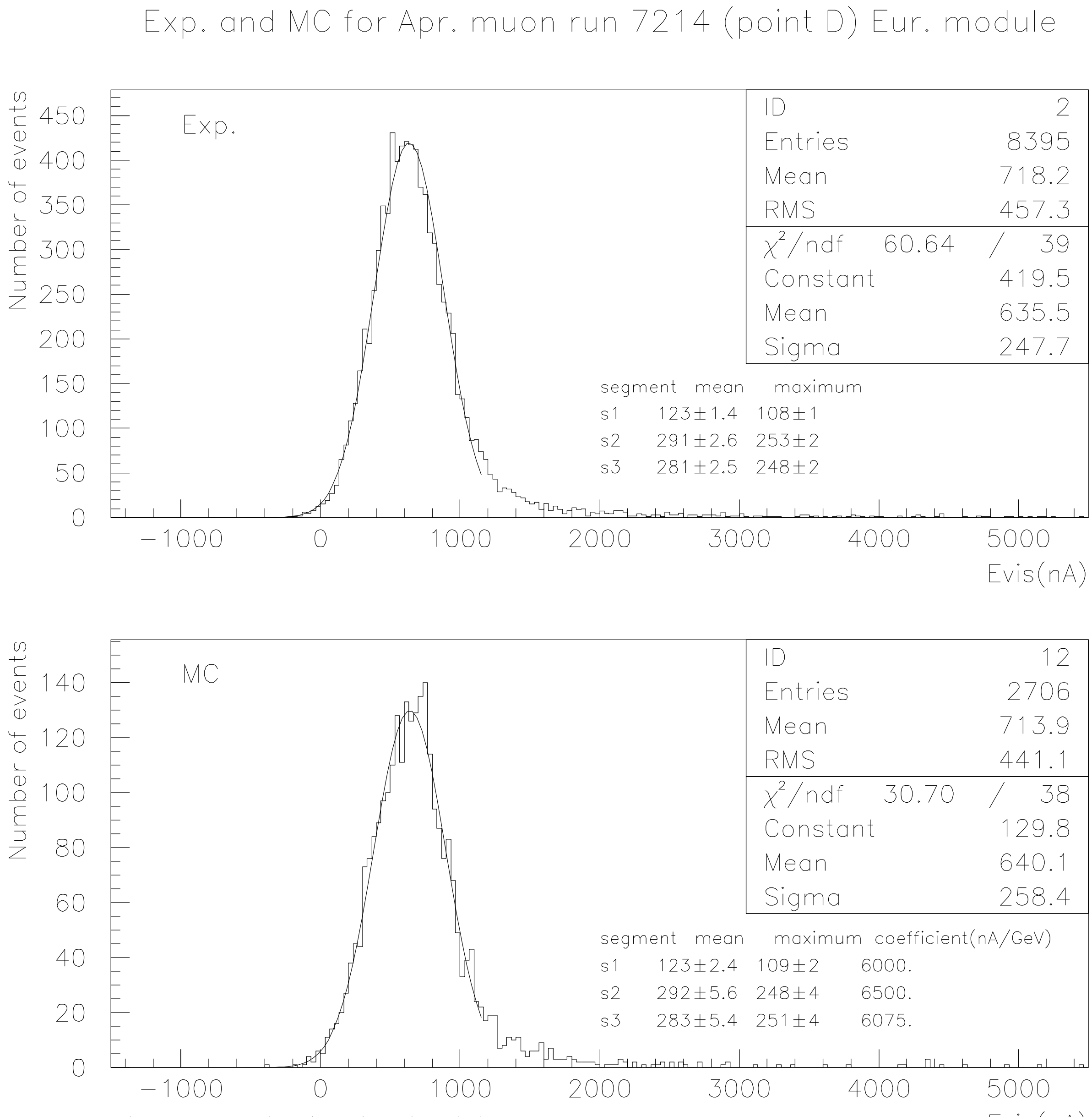
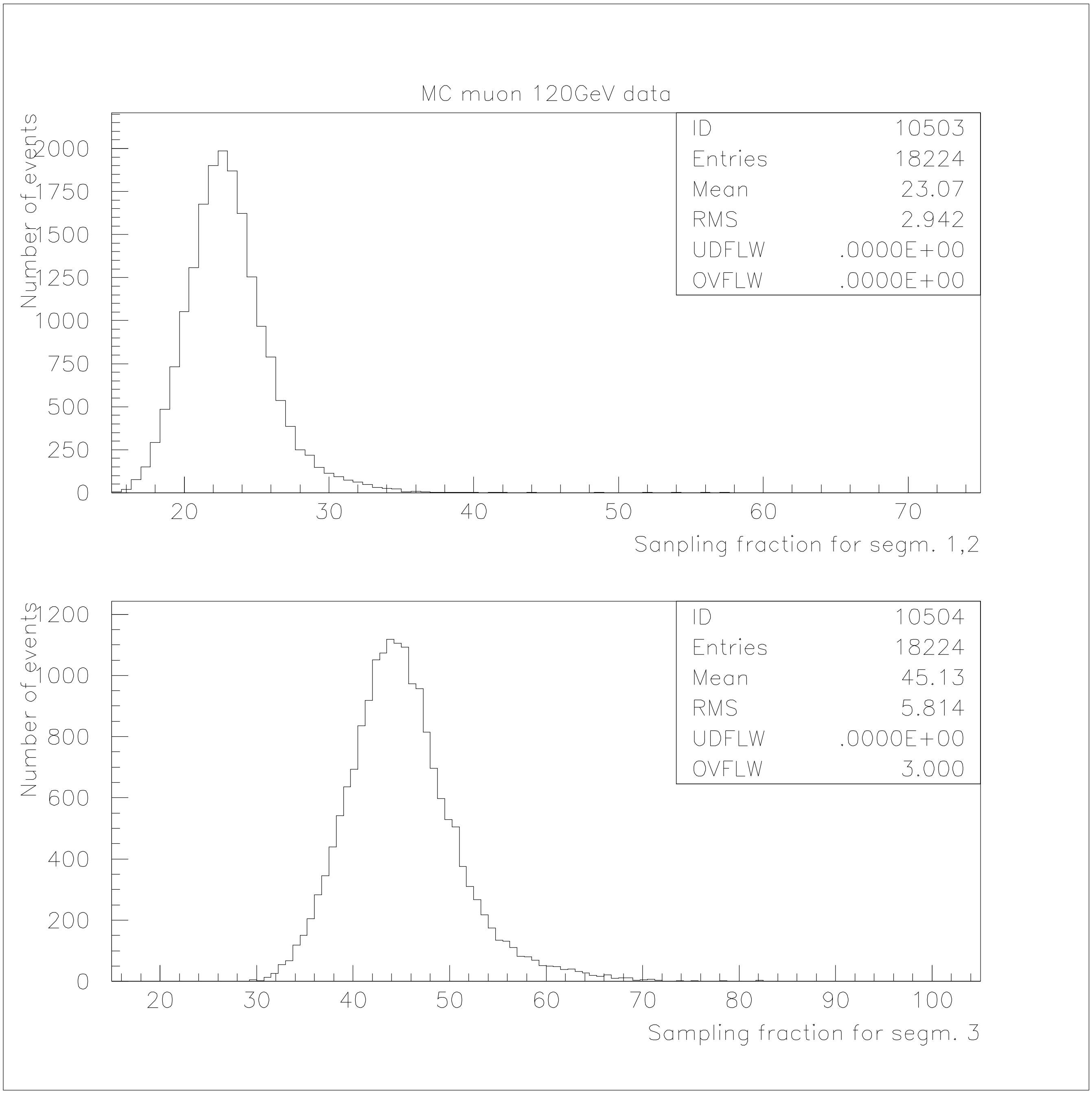
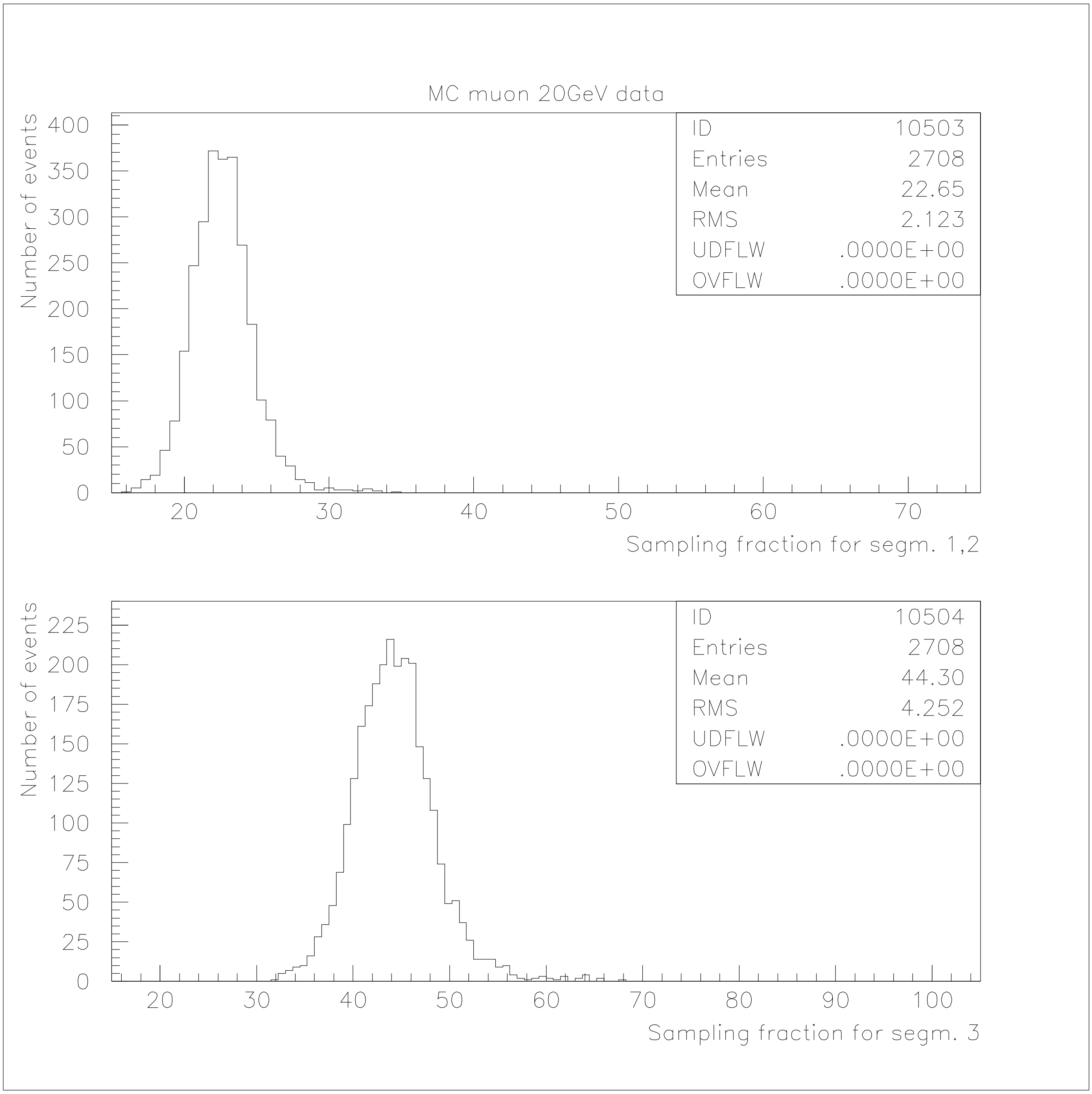


Fig. 7 The distribution in visible energy for 120 GeV muons for experimental and MC data.


MC muon 120GeV data
ID 10503
Entries 18224
Mean 23.07
RMS 2.942
UDFLW .0000E+00
OVFLW .0000E+00
Number of events
Sanpling fraction for segm. 1,2
ID 10504
Entries 18224
Mean 45.13
RMS 5.814
UDFLW .0000E+00
OVFLW 3.000
Number of events
Sampling fraction for segm. 3


MC muon 20GeV data
Number of events
ID 10503
Entries 2708
Mean 22.65
RMS 2.123
UDFLW .0000E+00
OVFLW .0000E+00
Sampling fraction for segm. 1,2
Number of events
ID 10504
Entries 2708
Mean 44.30
RMS 4.252
UDFLW .0000E+00
OVFLW .0000E+00
Sampling fraction for segm. 3