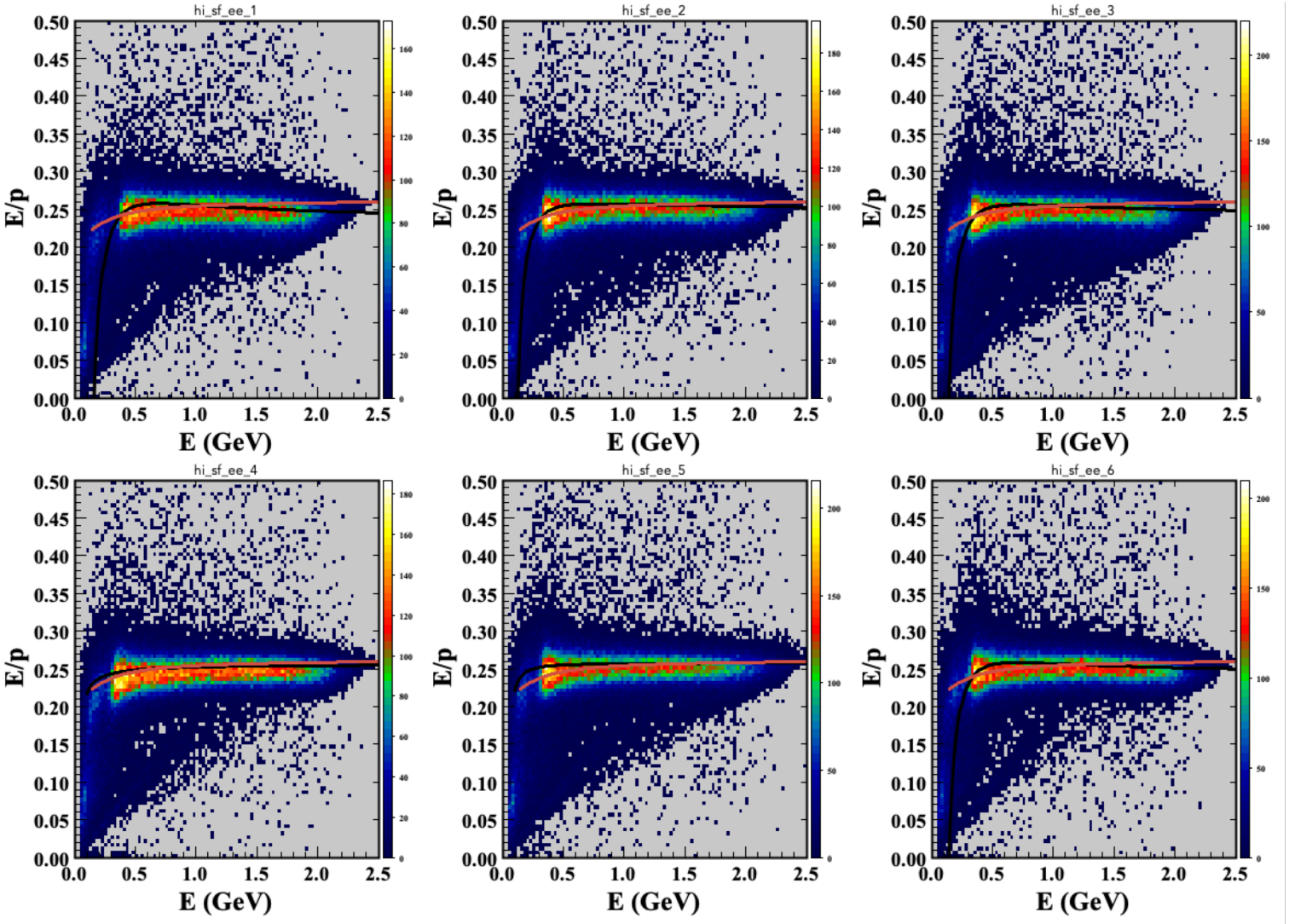
Inbending

Current and old SF parametrization

Old SF

New SF

SF= p0*(p1 + p2/x + p3*pow(x,-2))
Can diverge at low energies if p3 is negative



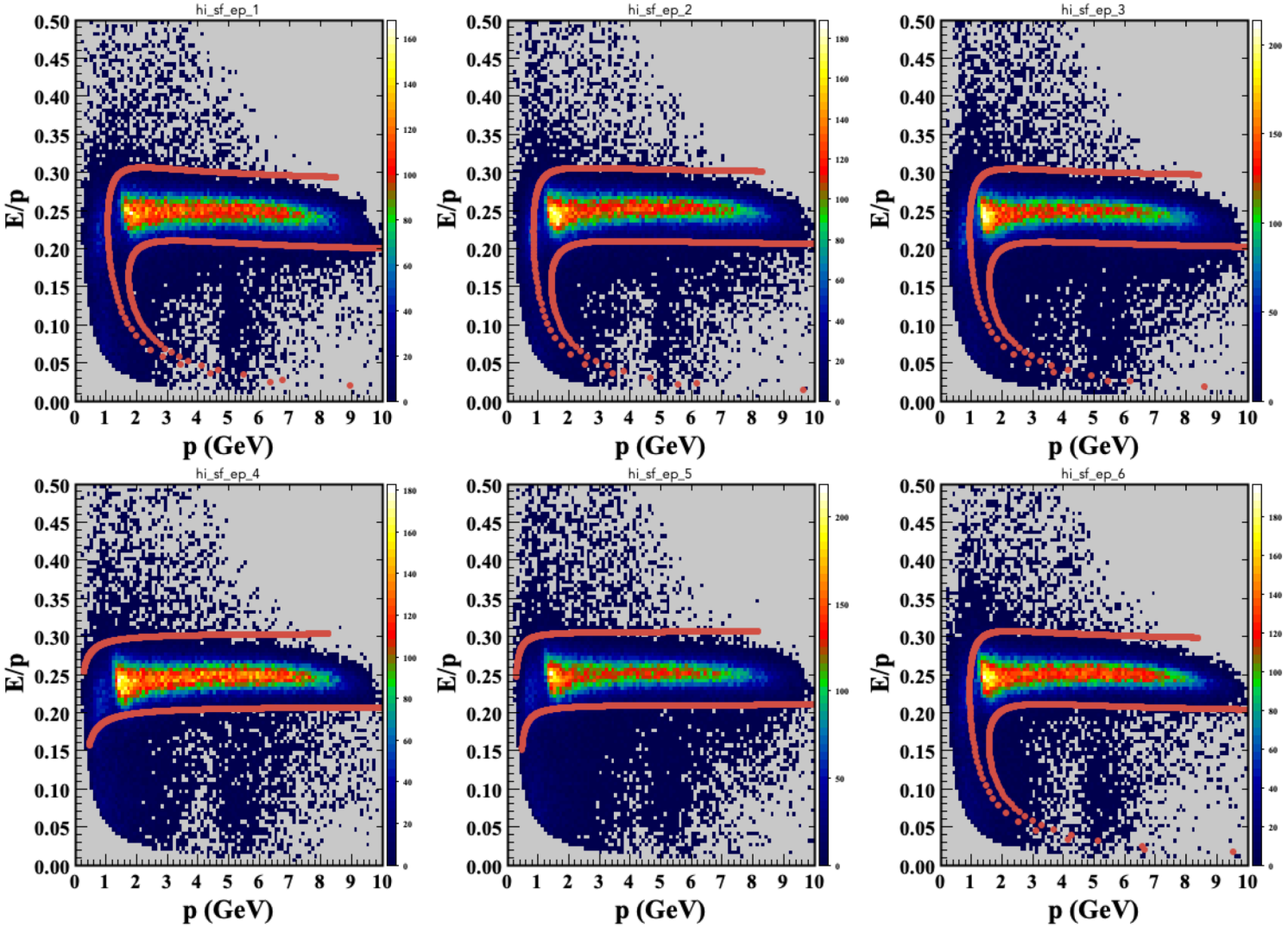
Events from run 5038, all negative particles with HTCC hit and ECAL cluster

Cluster cuts:

- lv and lw >15 cm
- Pcal energy >60 MeV

Event selection with current parametrization

”Curly” shape appears when p3 is negative and large in absolute value

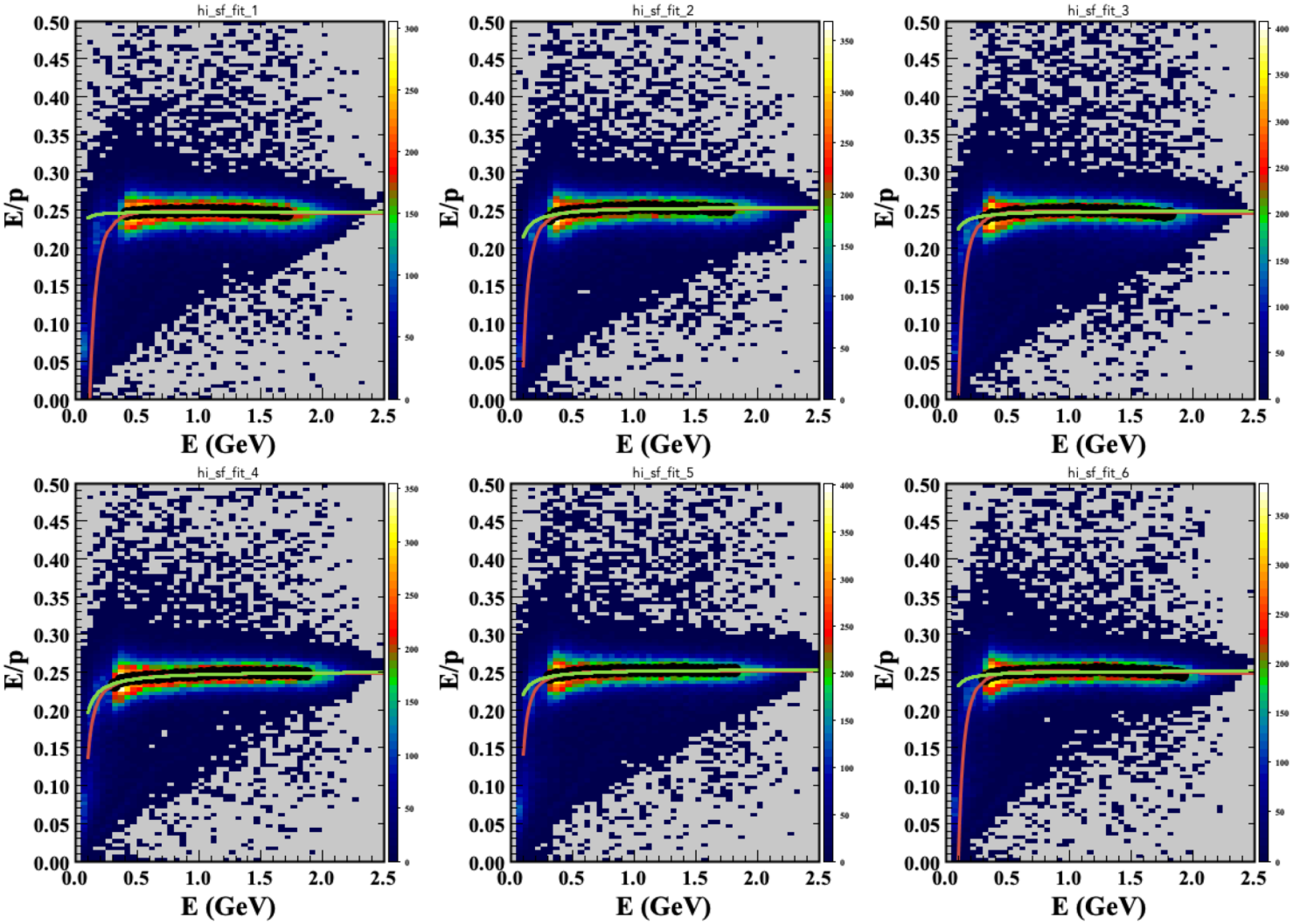


Top and bottom lines correspond to SF+/- 3 sigma

New parametrization

New SF fit with p1=1

New SF fit with p1=1 and p3>-0.001

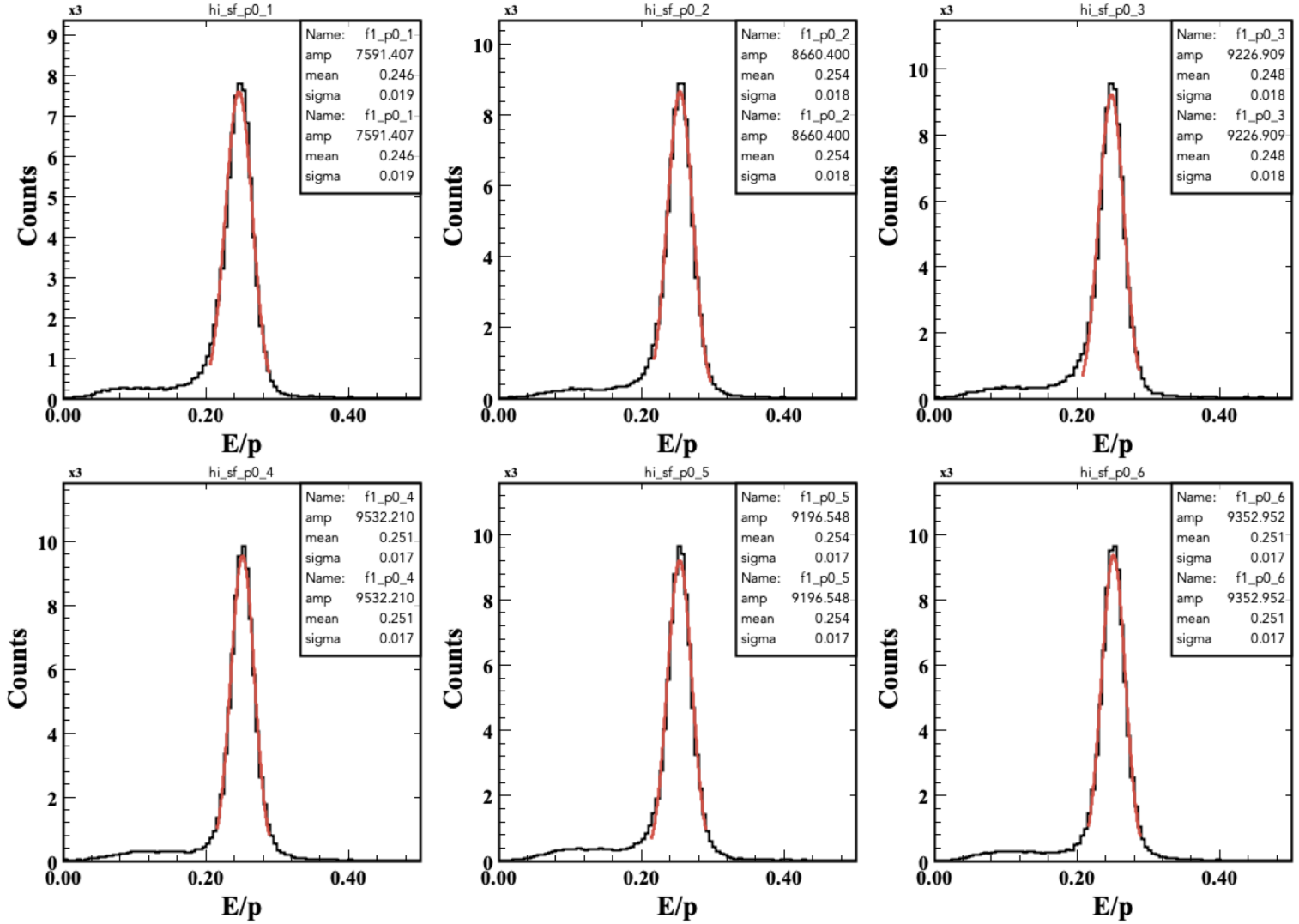


p1 was fixed to 1 to avoid "cross-talk" with the other parameters

In this way p0 is the "average" sampling fraction

SF sigmas

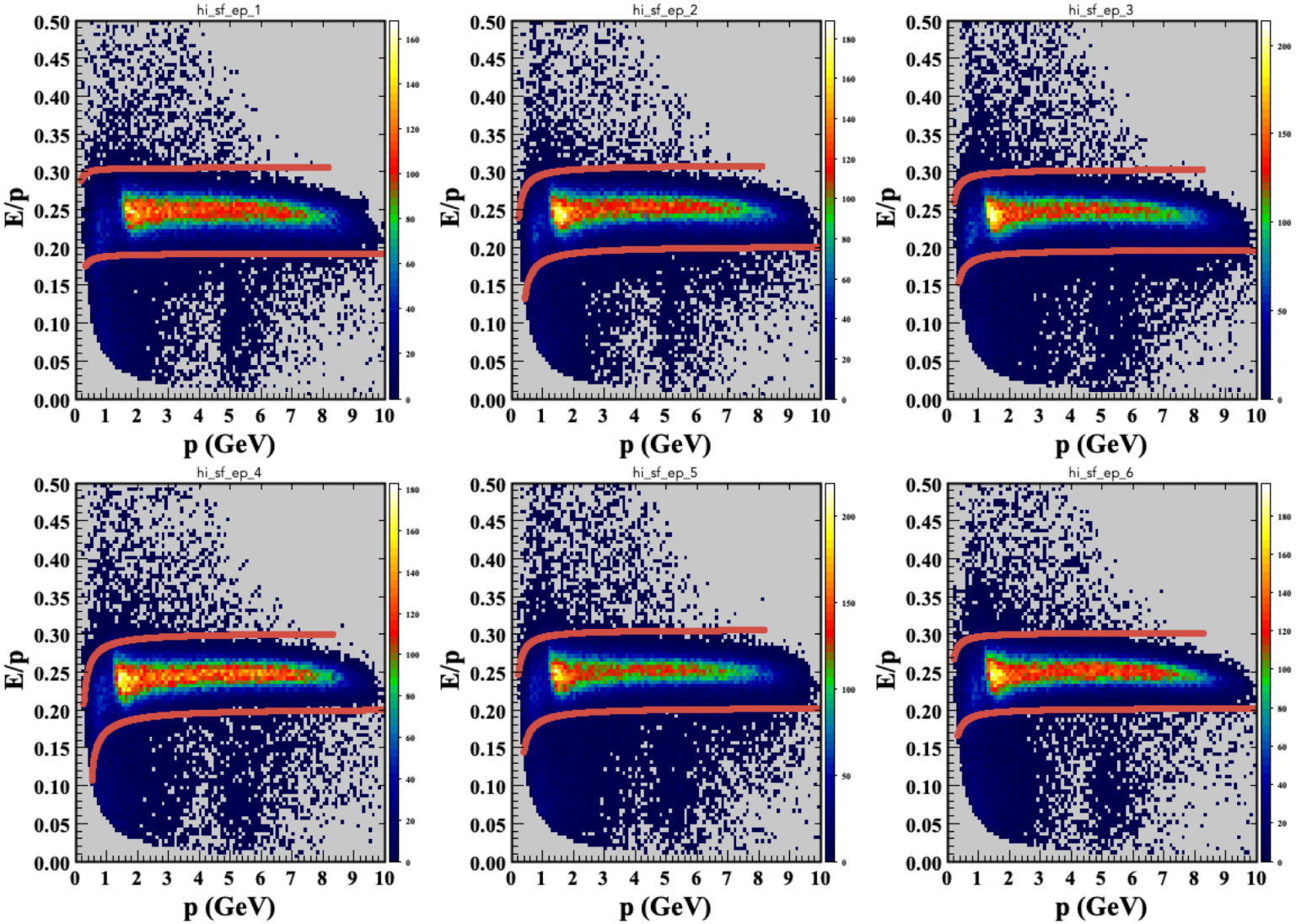
Plots show e/p/(p1+p2/x+p3x^2). Gaussian fit to extract sigmas for each sector



Inbending

Resulting selection

Limit on p3 reduces the “curly” shape that would appear for much smaller energies



Top and bottom lines correspond to SF+/- 3 sigma

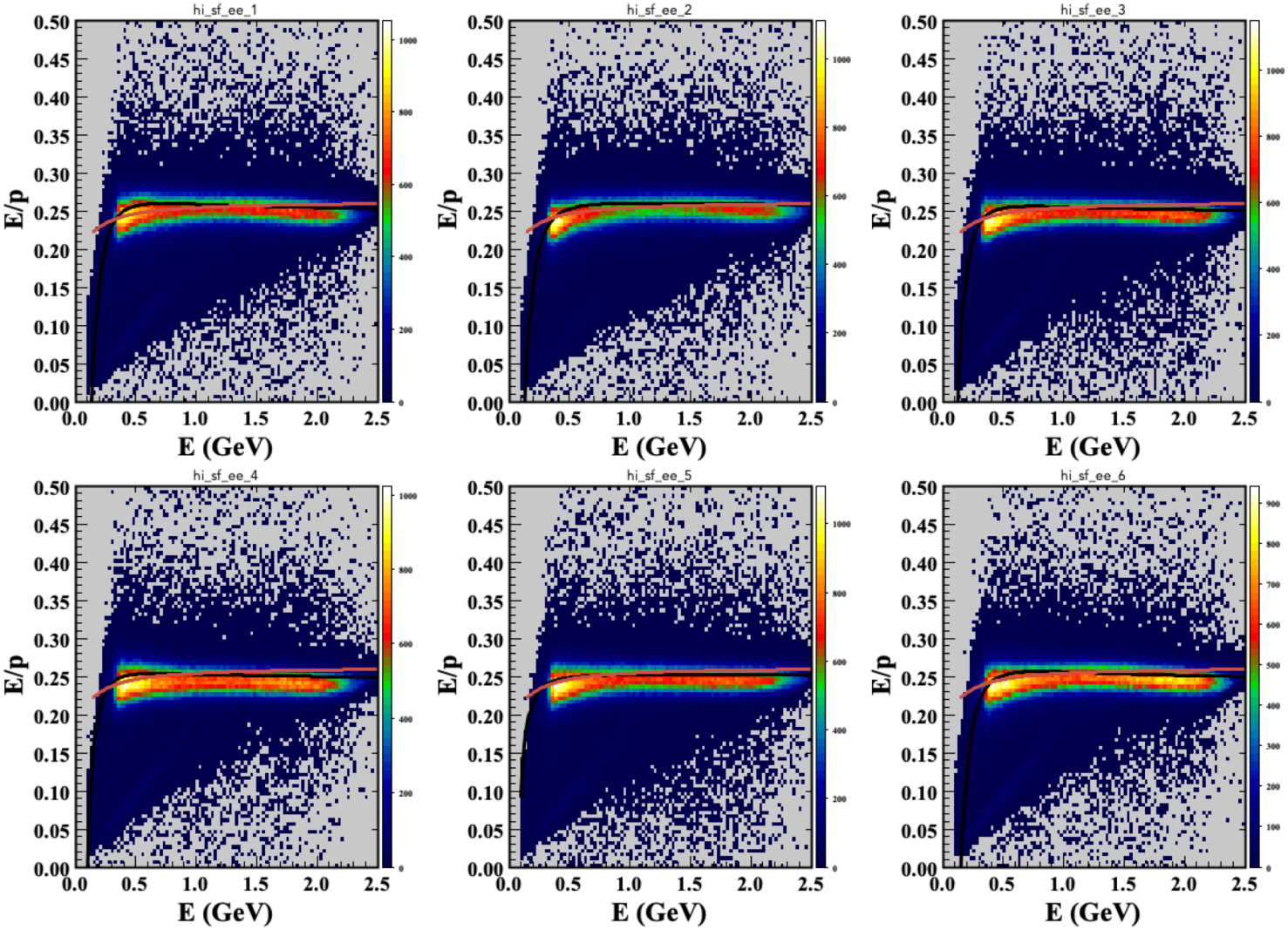
Outbending

Current and old SF parametrization

Old SF

New SF

SF= p0*(p1 + p2/x + p3*pow(x,-2))
Can diverge at low energies if p3 is negative



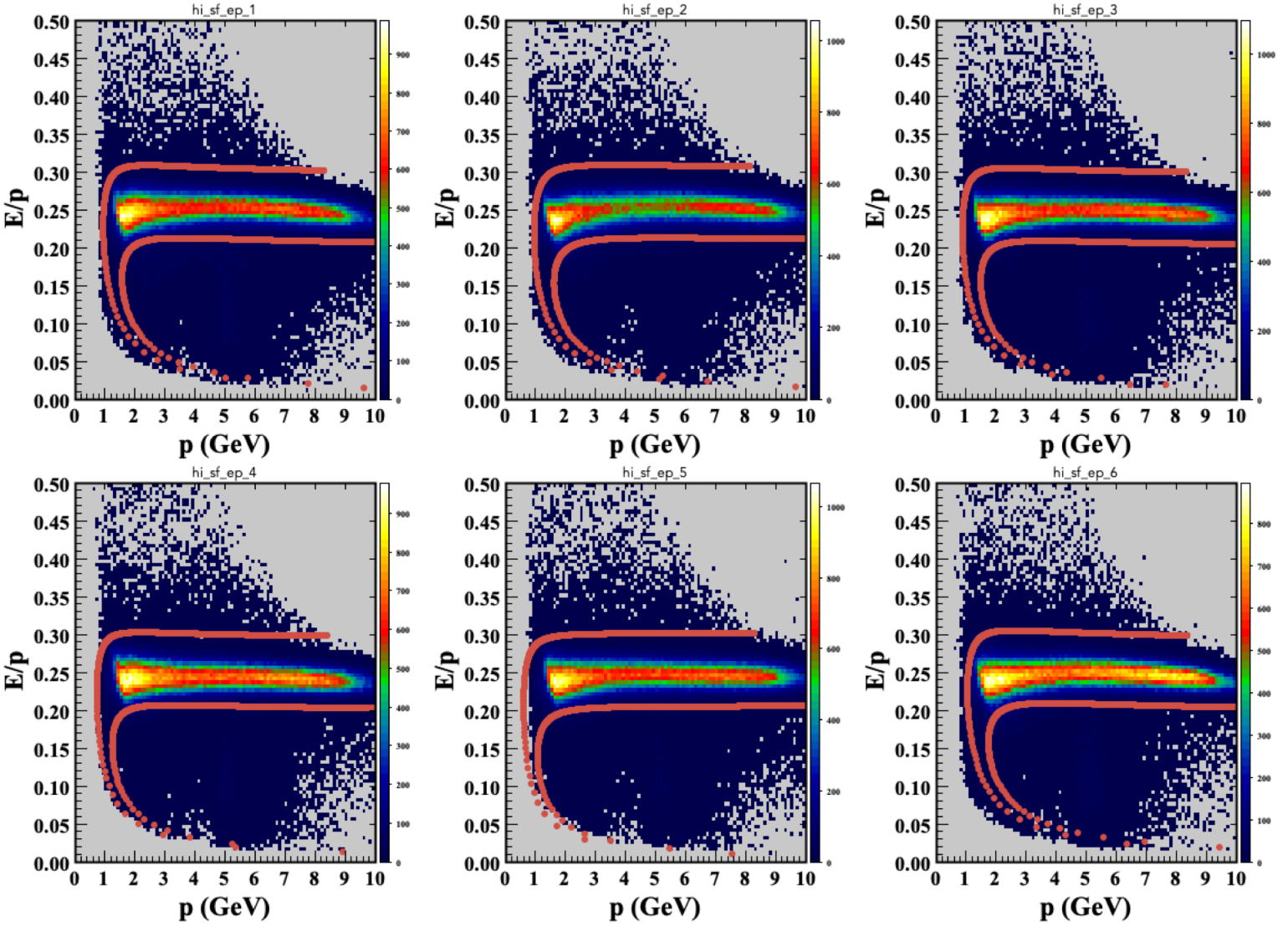
Events from run 5537, all negative particles with HTCC hit and ECAL cluster

Cluster cuts:

- lv and lw >15 cm
- Pcal and EC energies > 50 MeV

Event selection with current parametrization

”Curly” shape appears when p3 is negative and large in absolute value



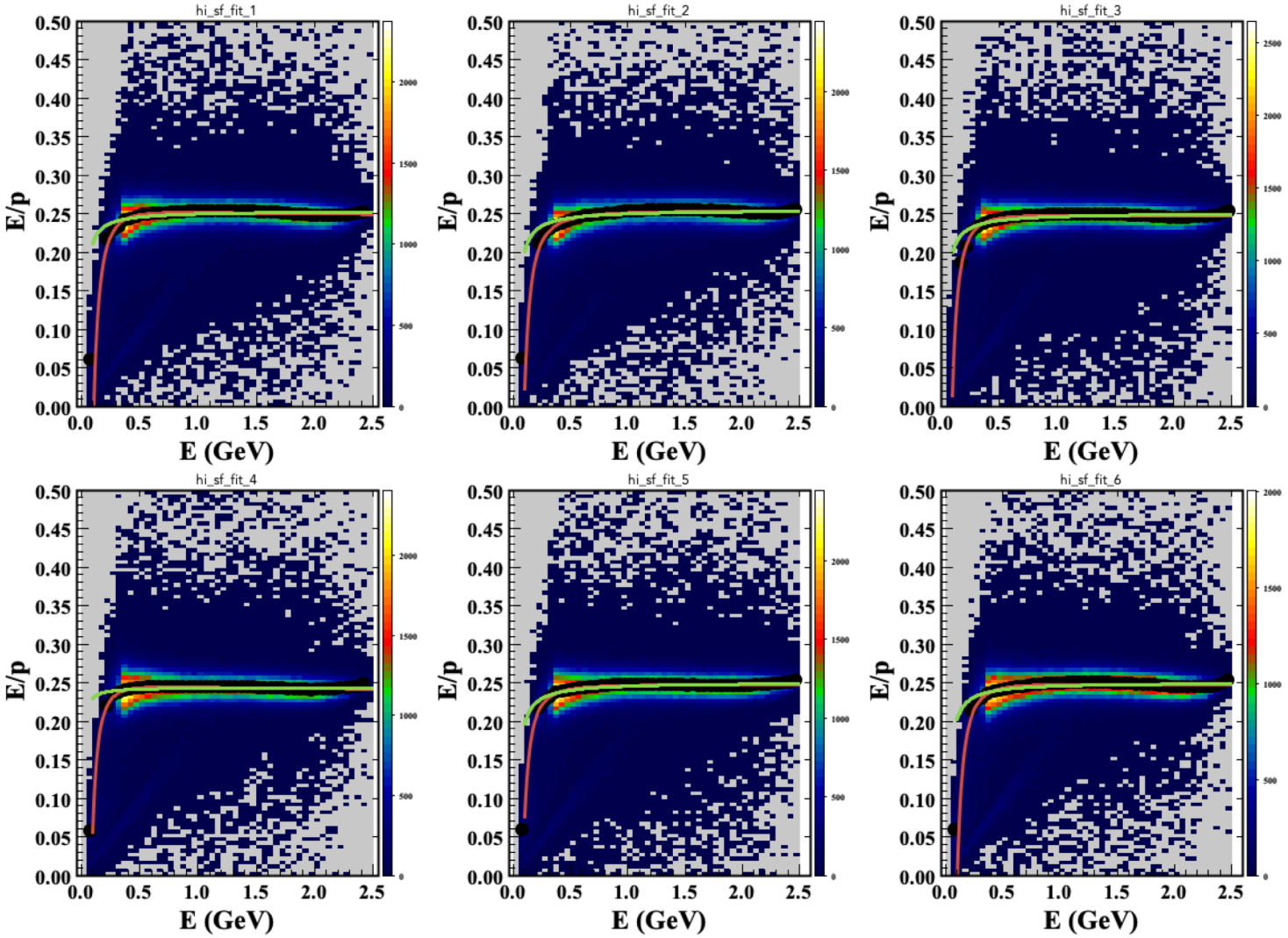
Top and bottom lines correspond to SF+/- 3 sigma

Outbending

New parameterization

New SF fit with p1=1

New SF fit with p1=1, p3>-0.001 and p2>-0.02 in sec 2



p1 was fixed to 1 to avoid "cross-talk" with the other parameters

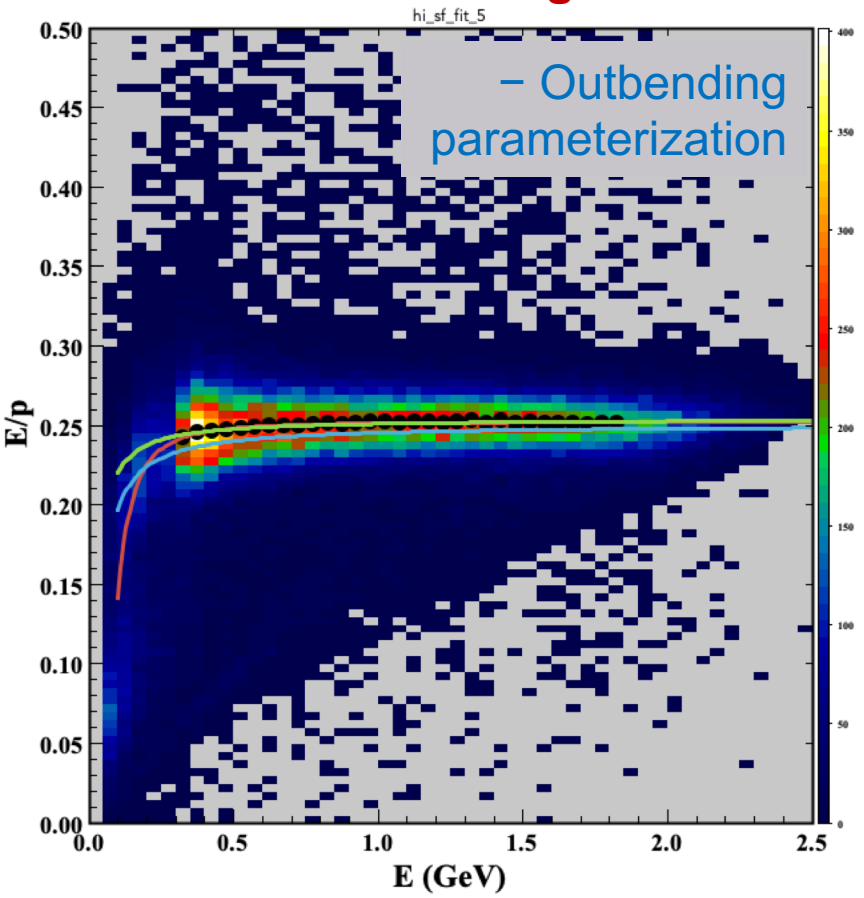
In this way p0 is the "average" sampling fraction

Inbending vs. Outbending

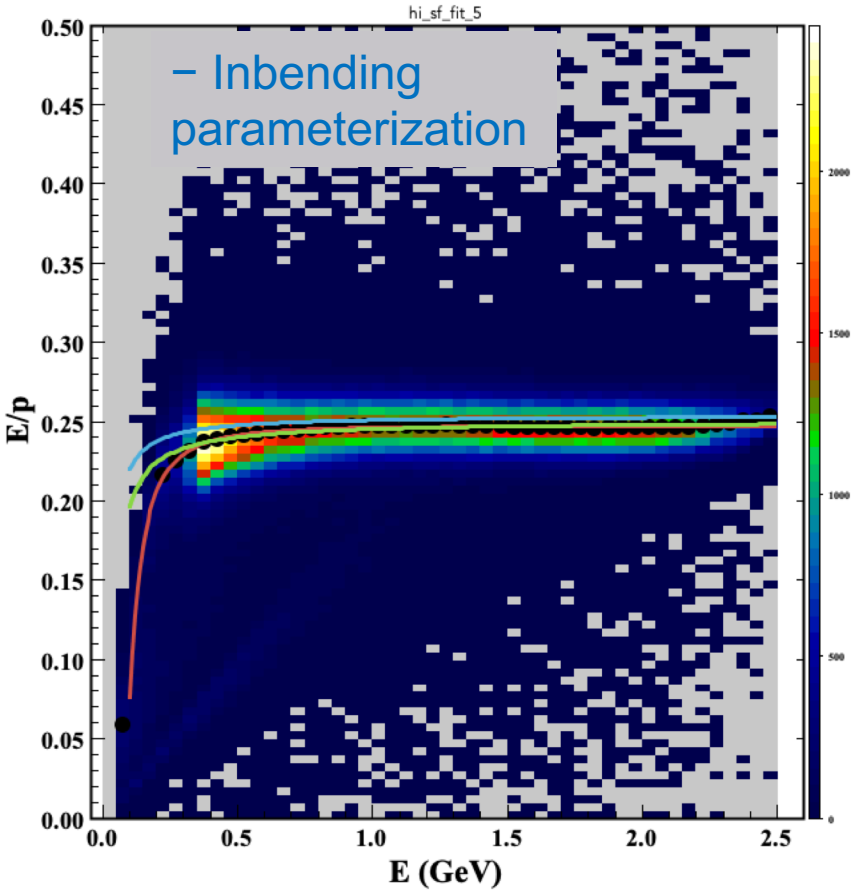
New SF fit with p1=1
New SF fit with p1=1 and p3>-0.001

Inbending and outbending parameterization are significantly different to require independent CCDB entries

Inbending

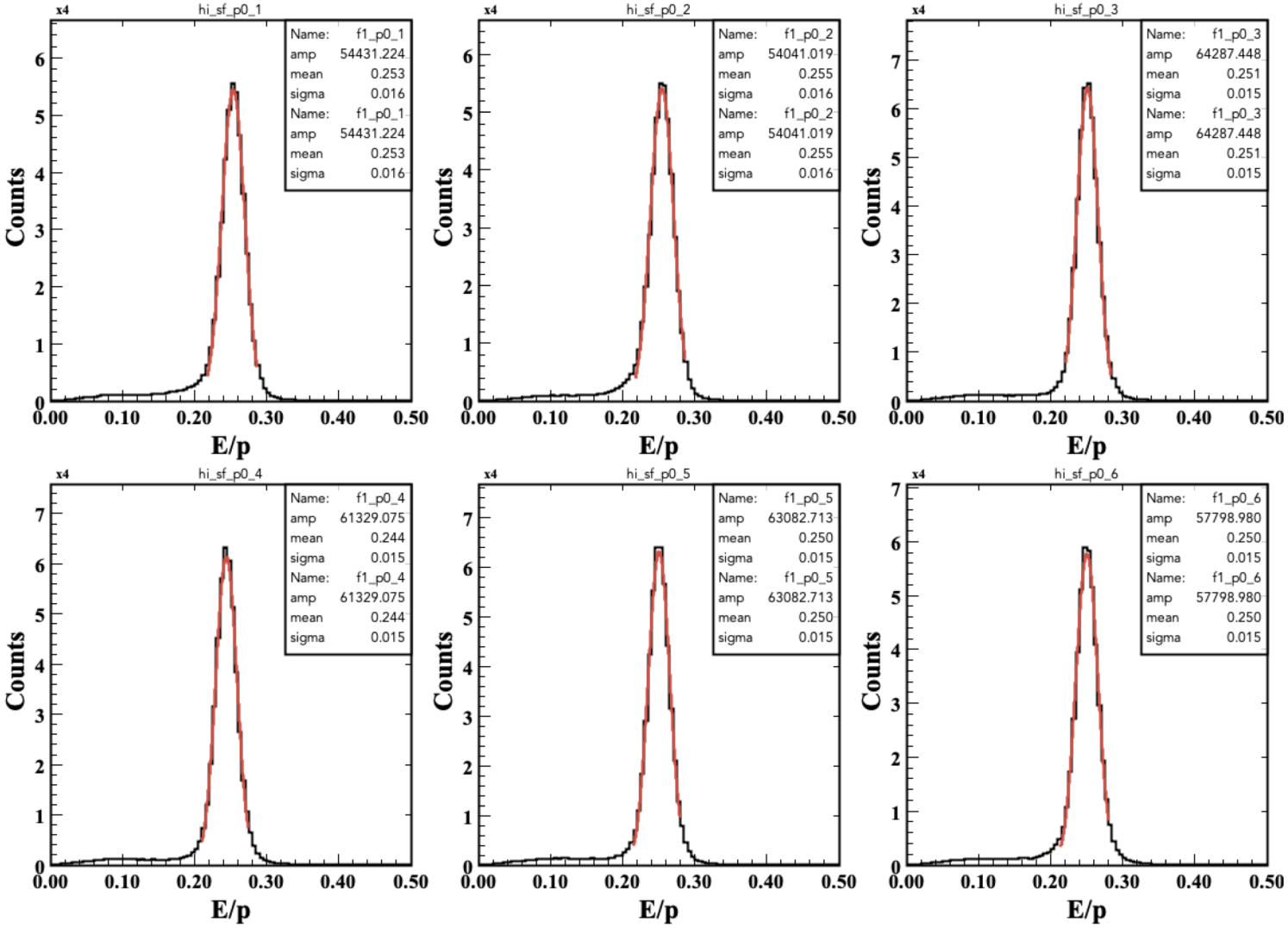


Outbending



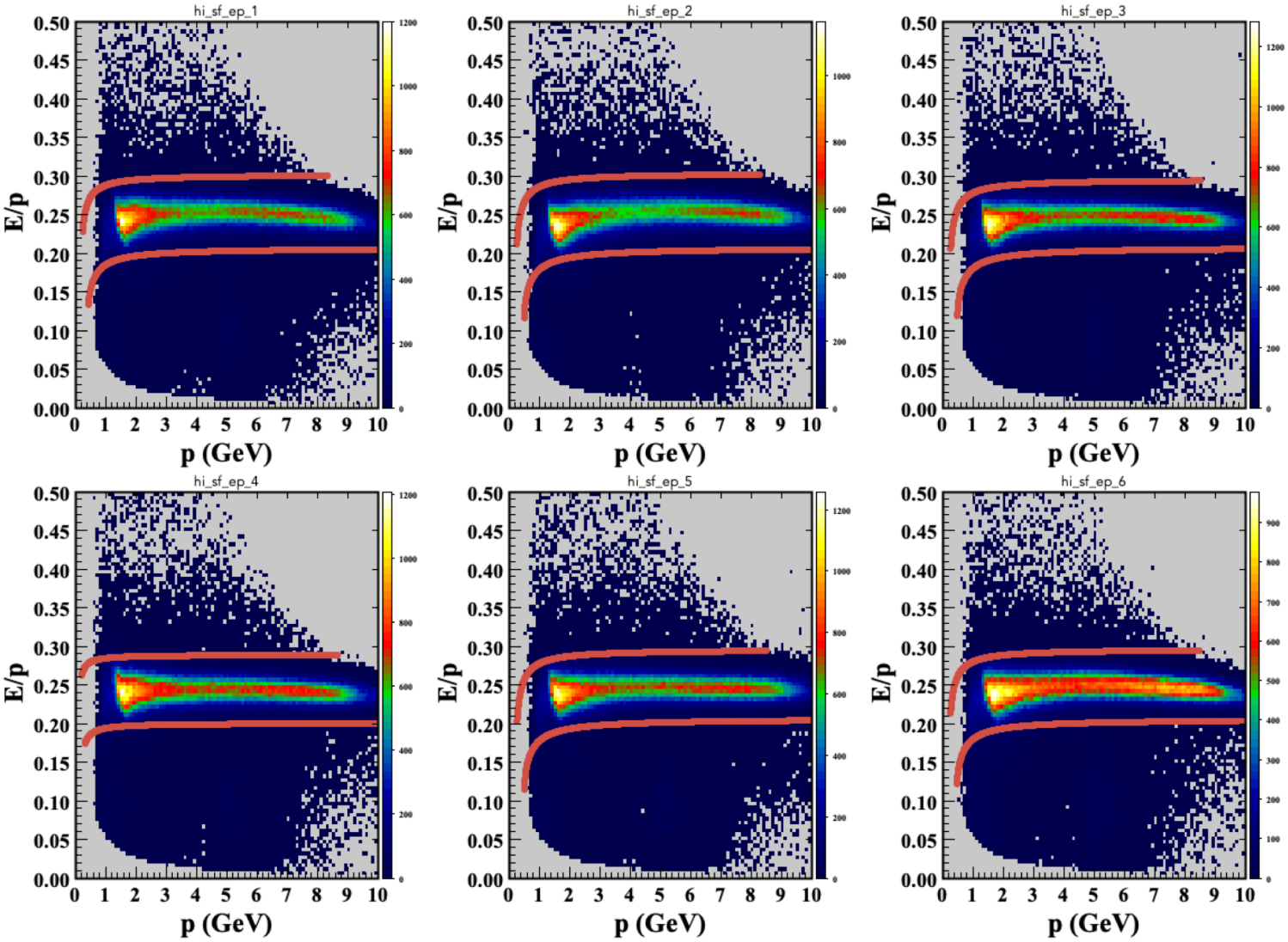
SF sigmas

Plots show e/p/(p1+p2/x+p3x^2). Gaussian fit to extract sigmas for each sector



Resulting selection

Limit on p3 reduces the “curly” shape that would appear for much smaller energies



Top and bottom lines correspond to SF+/- 3 sigma

New constants

Inbending

```
1 0 0 0.24789 1  -0.00242 -0.00010 0.01893 1 0 0
2 0 0 0.25474 1  -0.01498 -0.00010 0.01782 1 0 0
3 0 0 0.24946 1  -0.00887 -0.00010 0.01765 1 0 0
4 0 0 0.25169 1  -0.02098 -0.00010 0.01668 1 0 0
5 0 0 0.25411 1  -0.01249 -0.00010 0.01720 1 0 0
6 0 0 0.25174 1  -0.00689 -0.00010 0.01667 1 0 0
```

Outbending

```
1 0 0 0.25342 1  -0.01575 -0.00010 0.01583 1 0 0
2 0 0 0.25474 1  -0.02000 -0.00010 0.01606 1 0 0
3 0 0 0.25088 1  -0.01966 -0.00010 0.01464 1 0 0
4 0 0 0.24392 1  -0.00490 -0.00010 0.01472 1 0 0
5 0 0 0.25044 1  -0.02046 -0.00010 0.01493 1 0 0
6 0 0 0.25029 1  -0.01849 -0.00010 0.01514 1 0 0
```