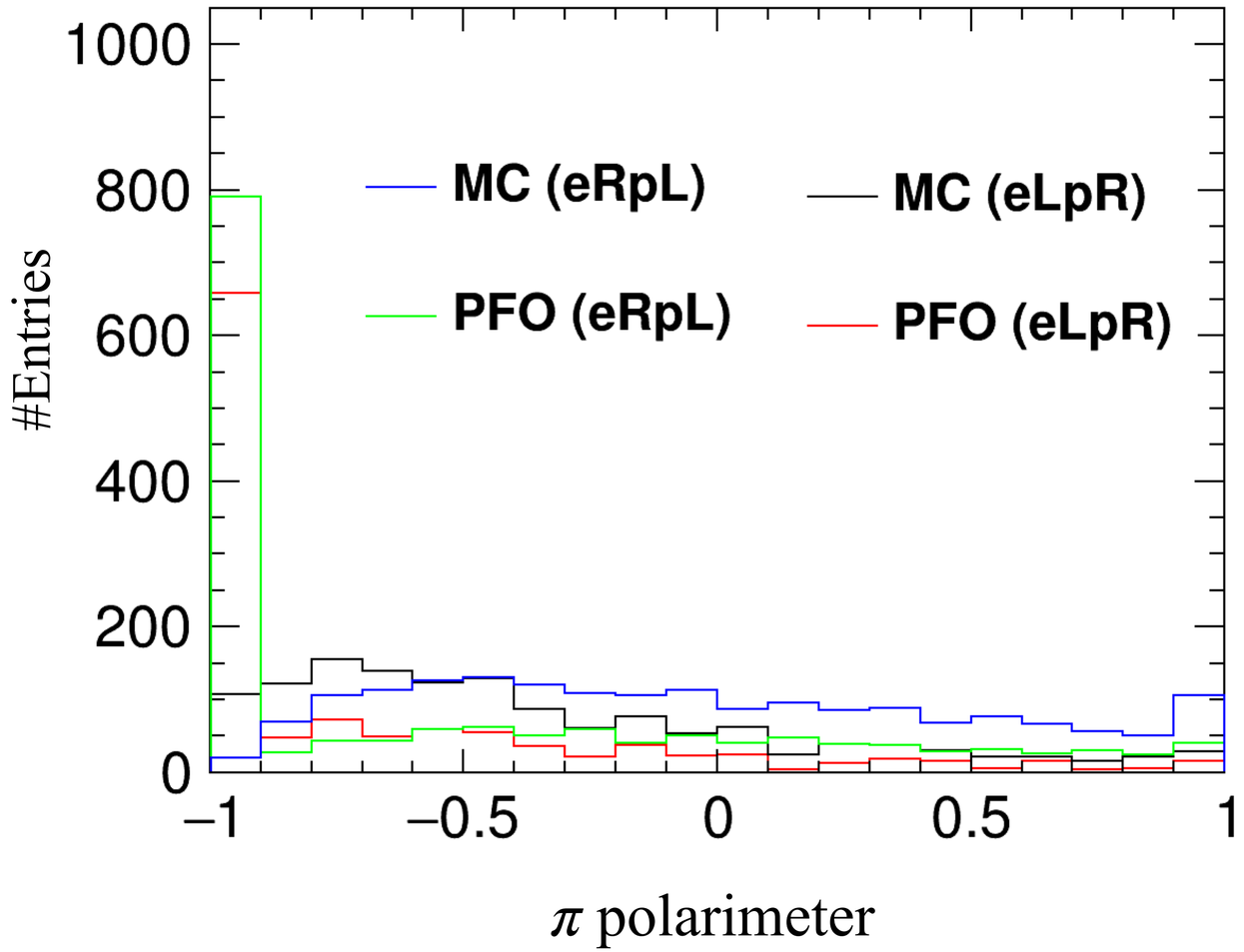
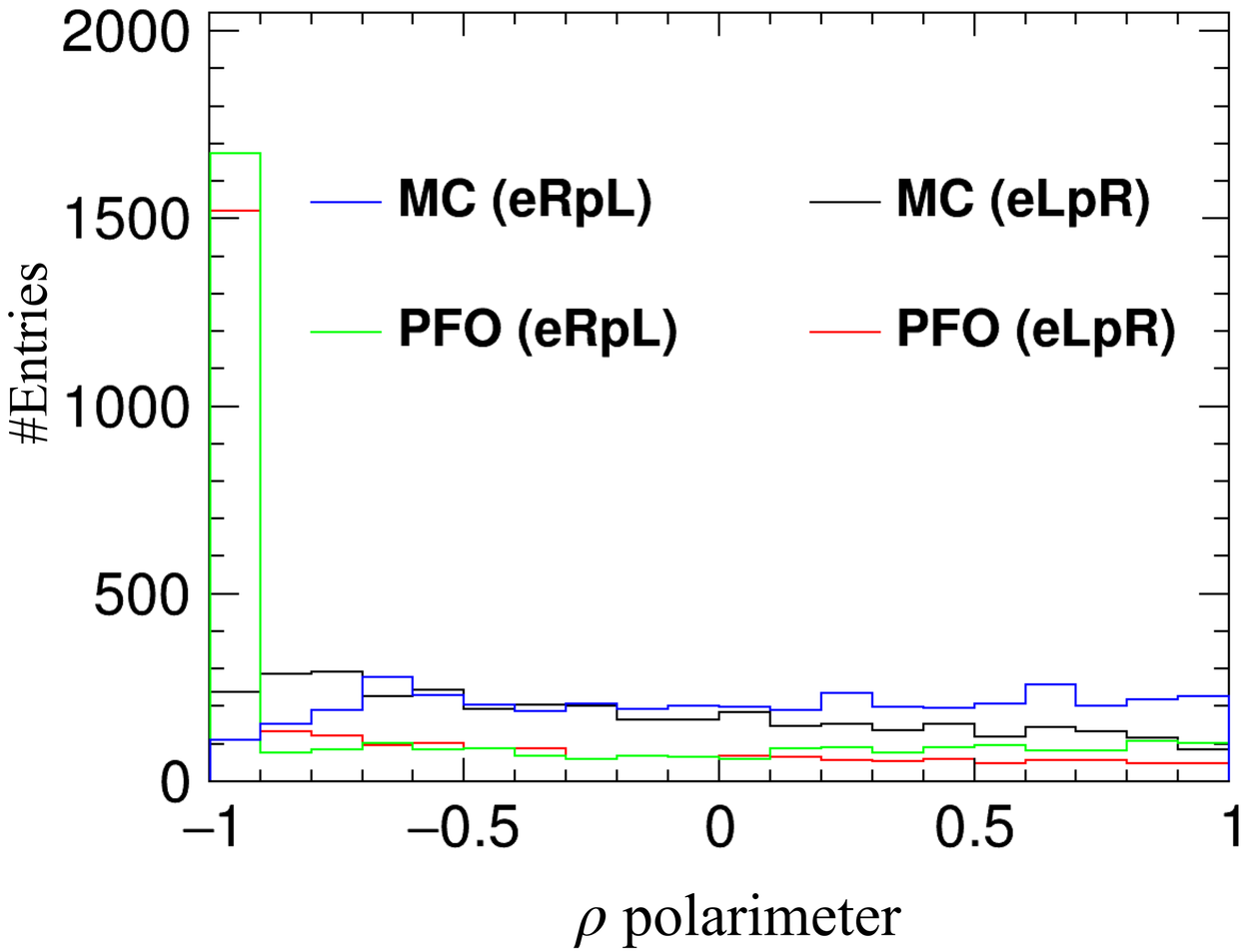
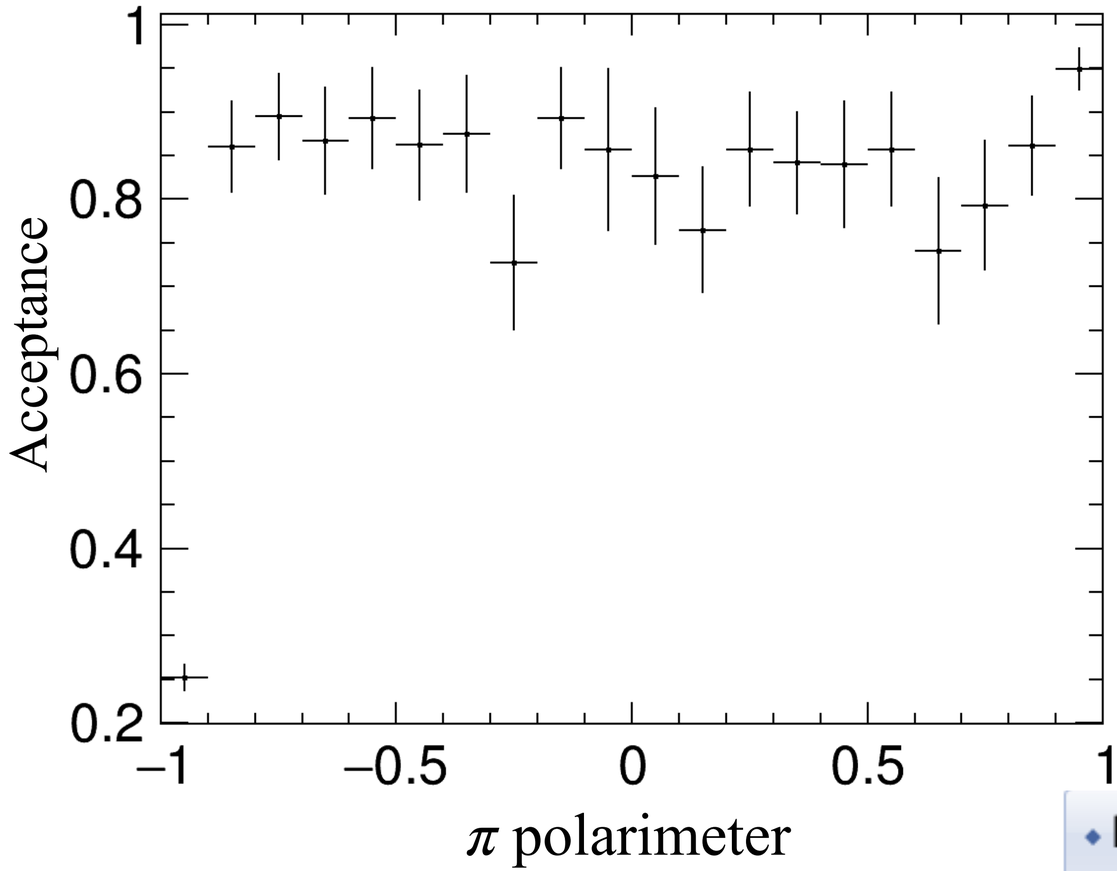
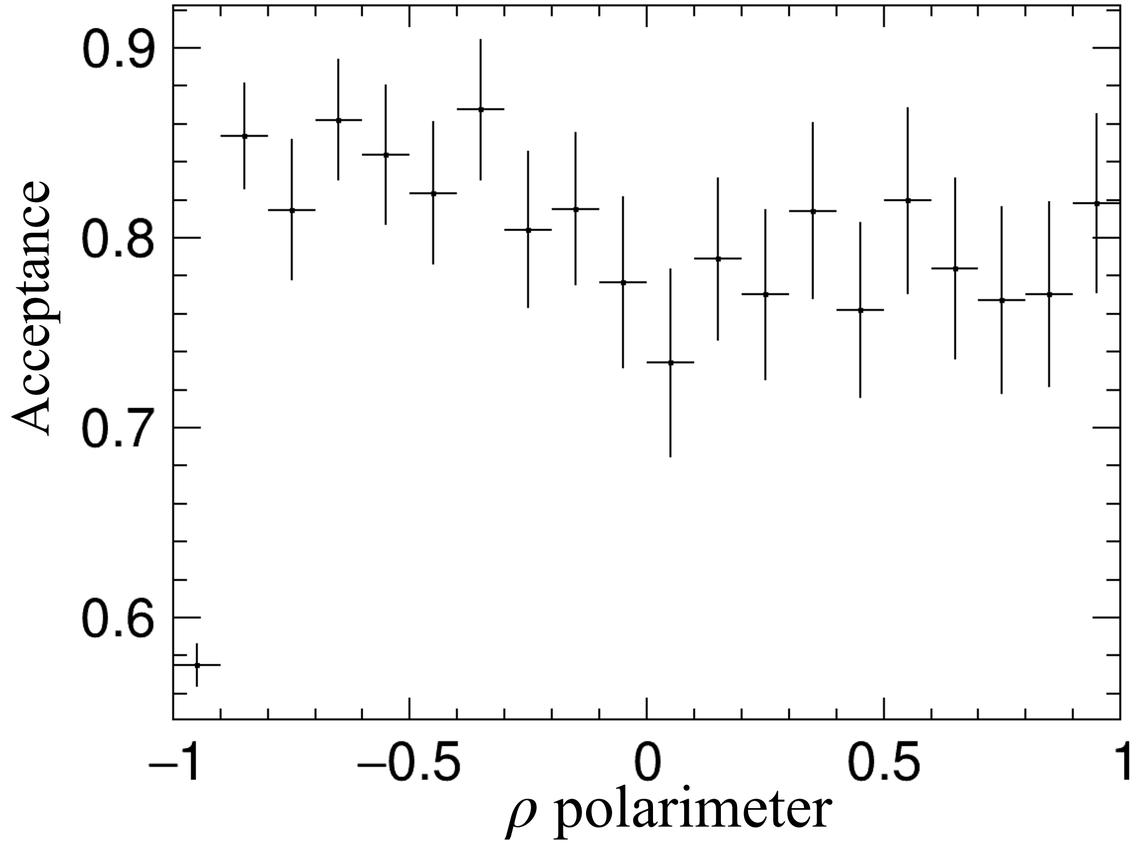




Fixed the small bug

better than before, but still something is strange…





hh2: using PFO
hh: using MC

$$\frac{hh2}{hh}$$

hh3->Divide(hh2, hh, 1.0,1.0, "B");

w/ Binomial errors

◆ Divide() [2/3]

```
Bool_t TH1::Divide ( const TH1 *  h1,
                     const TH1 *  h2,
                     Double_t     c1 = 1,
                     Double_t     c2 = 1,
                     Option_t *   option = " "
                   )
```

Replace contents of this histogram by the division of h1 by h2.

```
this = c1*h1/(c2*h2)
```

problem

```
python tauAna.py
```



```
from pyLCIO.io import LcioReader, StdHepReader
```

```
Loading LCIO ROOT dictionaries ...
Error in <TClass::LoadClassInfo>: no interpreter information for class EVENT is available even though it has a TClass initialization routine.
Error in <TClass::LoadClassInfo>: no interpreter information for class EVENT is available even though it has a TClass initialization routine.
Error in <TClass::LoadClassInfo>: no interpreter information for class EVENT is available even though it has a TClass initialization routine.
Error in <TClass::LoadClassInfo>: no interpreter information for class EVENT is available even though it has a TClass initialization routine.
Error in <TClass::LoadClassInfo>: no interpreter information for class IMPL is available even though it has a TClass initialization routine.
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Error in <TClass::LoadClassInfo>: no interpreter information for class IO is available even though it has a TClass initialization routine.
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Error in <TClass::LoadClassInfo>: no interpreter information for class IOIMPL is available even though it has a TClass initialization routine.
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Error in <TClass::LoadClassInfo>: no interpreter information for class IOIMPL is available even though it has a TClass initialization routine.
Error in <TClass::LoadClassInfo>: no interpreter information for class UTIL is available even though it has a TClass initialization routine.
Error in <TClass::LoadClassInfo>: no interpreter information for class UTIL is available even though it has a TClass initialization routine.
Error in <TClass::LoadClassInfo>: no interpreter information for class UTIL is available even though it has a TClass initialization routine.
Error in <TClass::LoadClassInfo>: no interpreter information for class UTIL is available even though it has a TClass initialization routine.
```

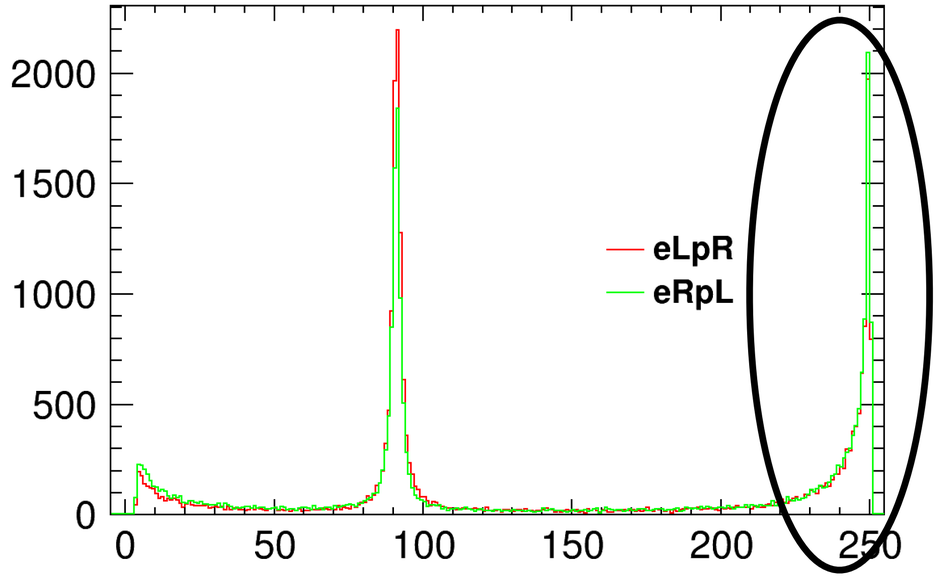
Plan

Midpoint method:
Have seen that the method works well in simple cases

Next, try with all MC and see the distribution

acceptance (Cone method) + acceptance (Midpoint method) = 1 ?

Midpoint method is applied when Cone method is failed



and understand the shape
by radiator function D

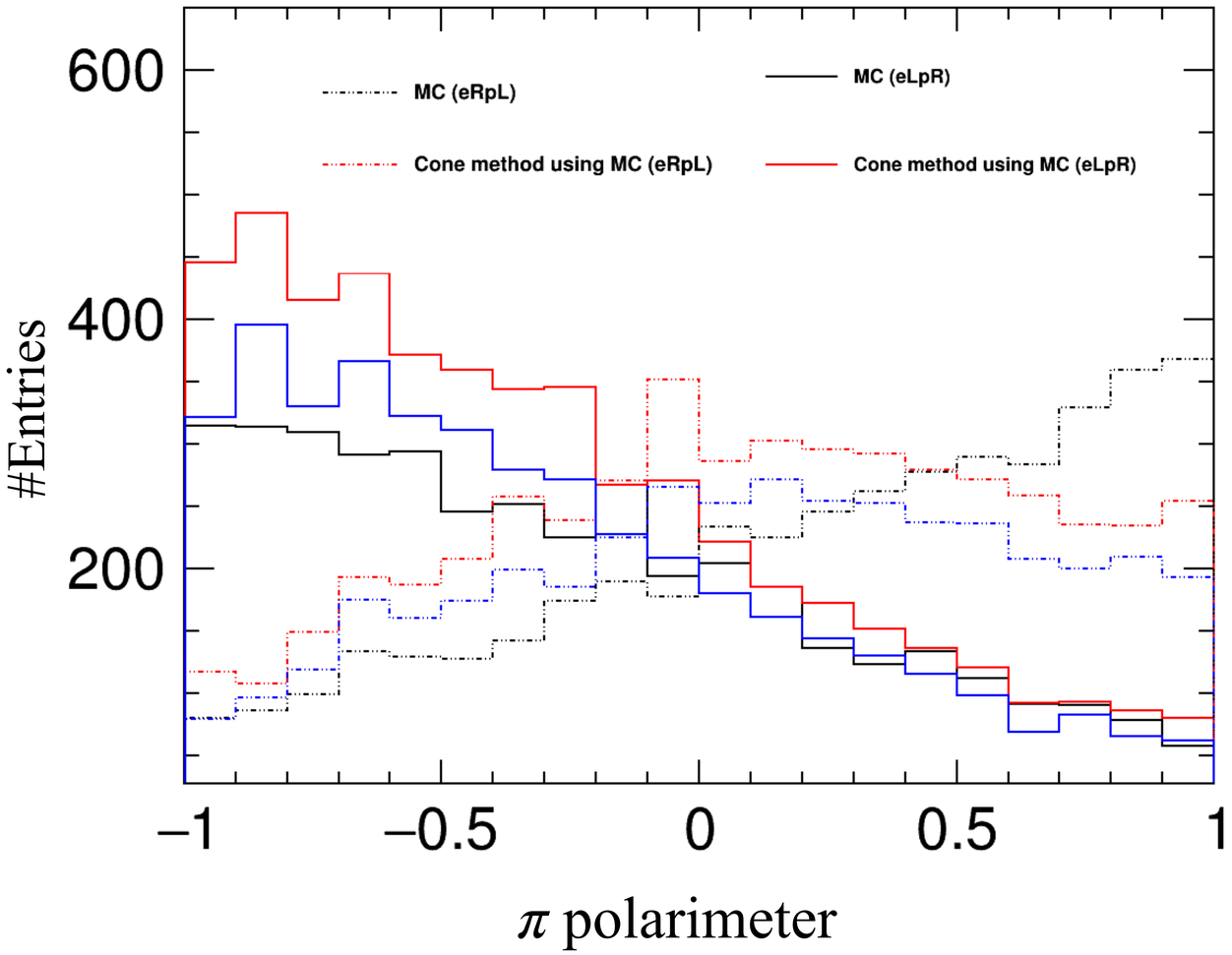
$$D(1-x,s)^2 = H(x,s) = \Delta_2 \beta x^{\beta-1} - \Delta_1 \beta \left(1-\frac{x}{2}\right) + \frac{\beta^2}{8}\left[-4(2-x)\log x - \frac{1+3(1-x)^2}{x}\log(1-x) - 2x\right]$$

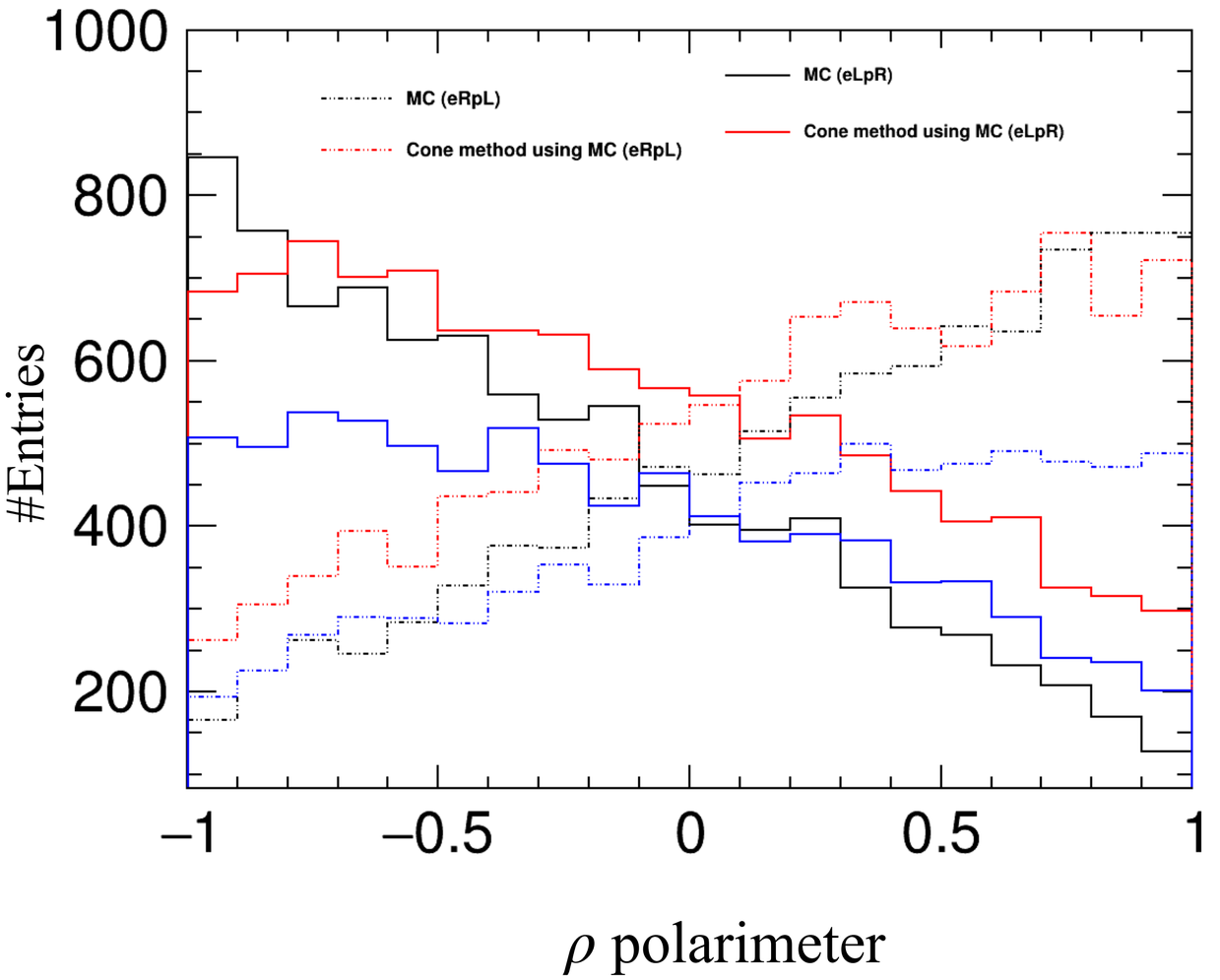
Hayasaka-san asked us and
Suehara-san answered

Fujimoto, J., Kurihara, Y. & Quach, N.M.U.

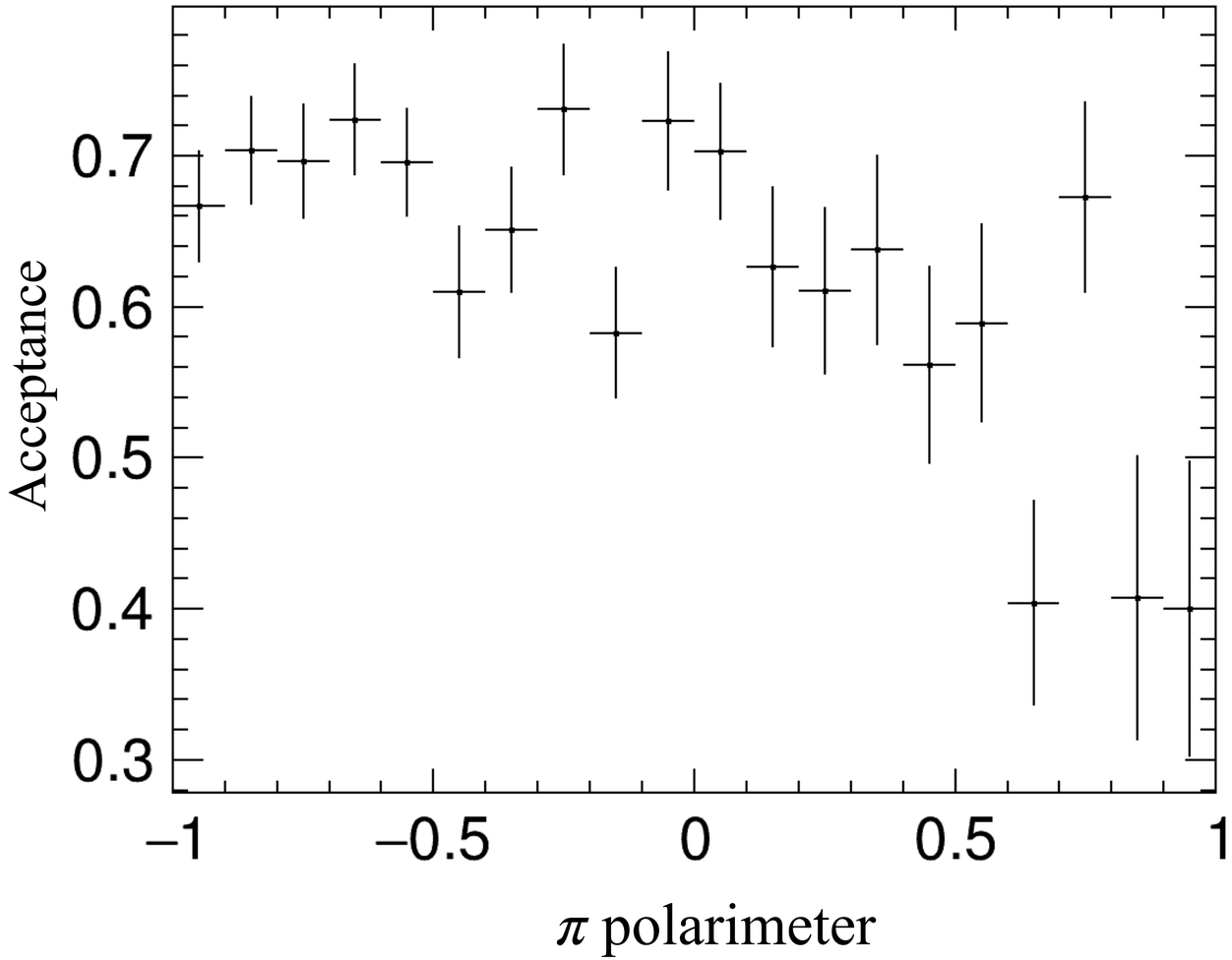
https://doi.org/10.1140/epjc/s10052-019-7026-7

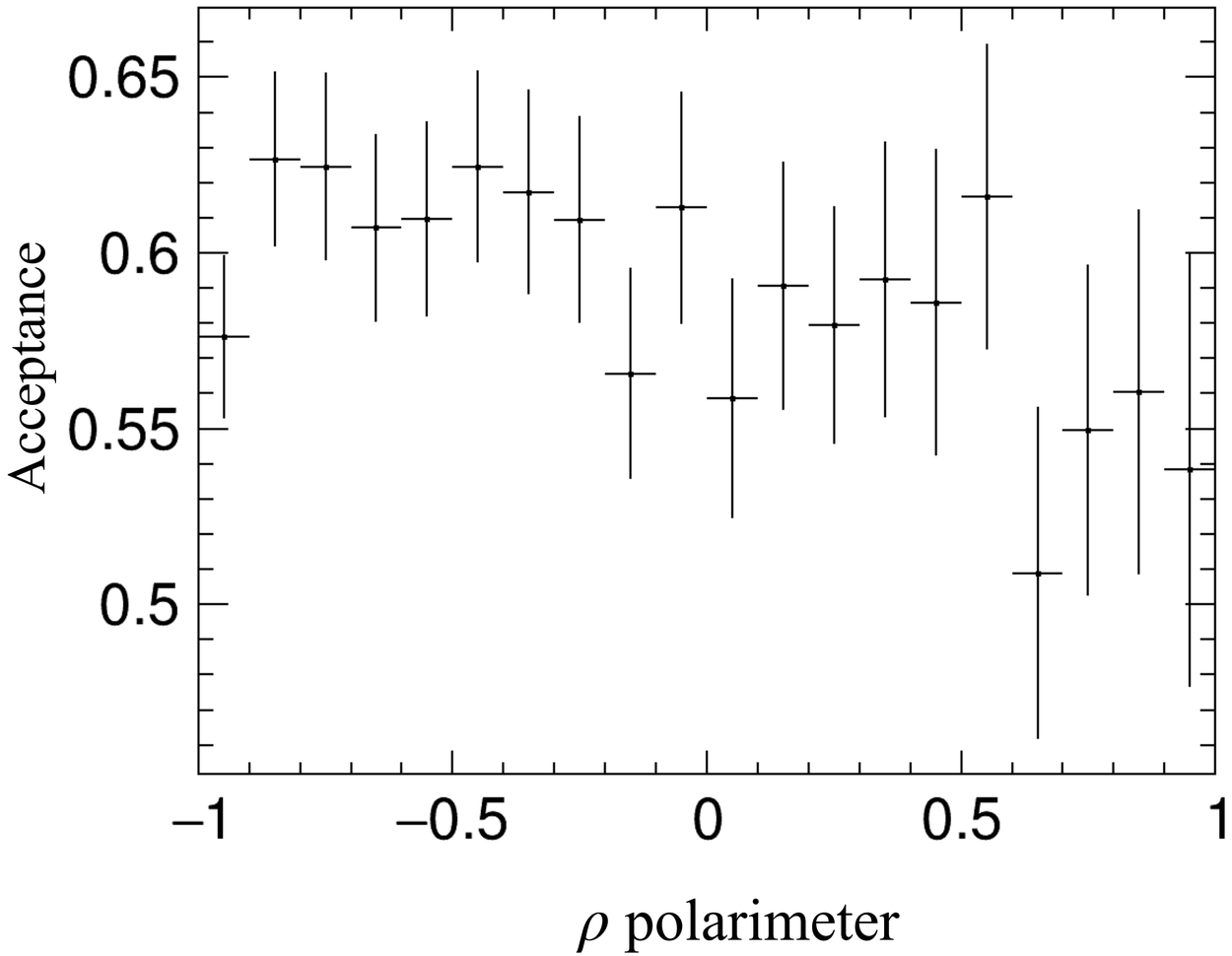
Cone method


MC (eRpL)
MC (eLpR)
Cone method using MC (eRpL)
Cone method using MC (eLpR)
#Entries
600
400
200
−1
−0.5
0
0.5
1
π polarimeter

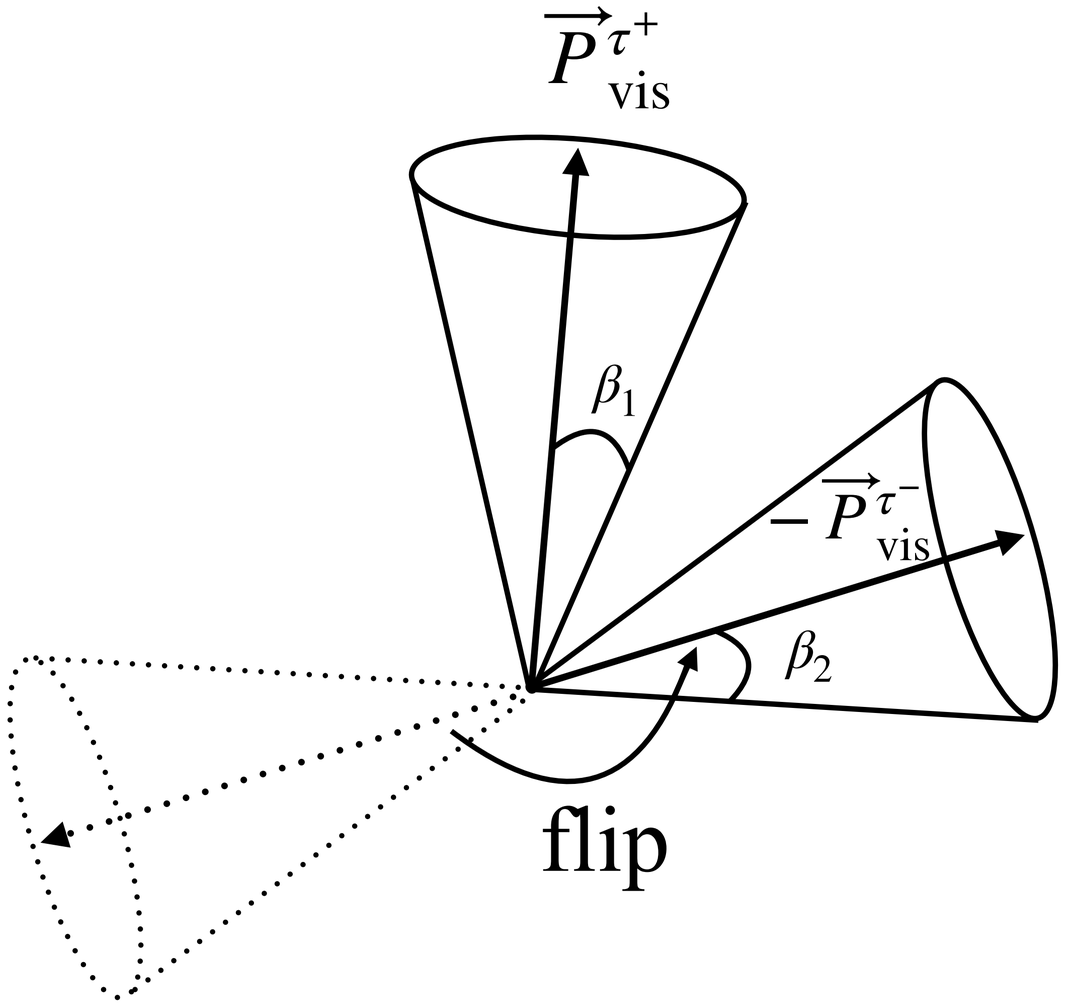

MC (eRpL)
MC (eLpR)
Cone method using MC (eRpL)
Cone method using MC (eLpR)
#Entries
1000
800
600
400
200
−1
−0.5
0
0.5
1
ρ polarimeter

Cone method

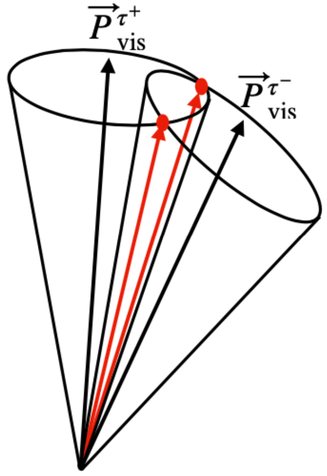

Acceptance
0.7
0.6
0.5
0.4
0.3
–1
–0.5
0
0.5
1
π polarimeter


Acceptance
0.65
0.6
0.55
0.5
–1
–0.5
0
0.5
1
ρ polarimeter

“cone method” to reconstruct tau

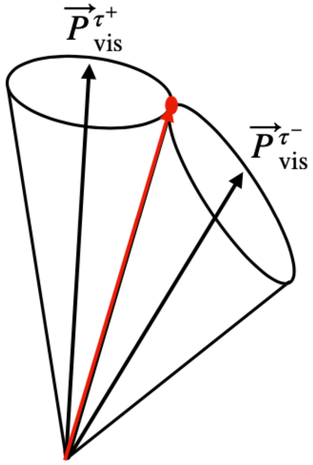


$\beta_1 + \beta_2 > \beta_{cc}$



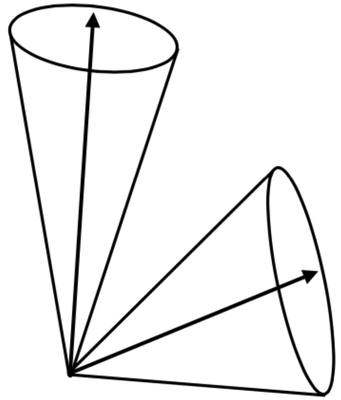
2 possible solutions

$\beta_1 + \beta_2 = \beta_{cc}$



1 possible solution

$\beta_1 + \beta_2 < \beta_{cc}$



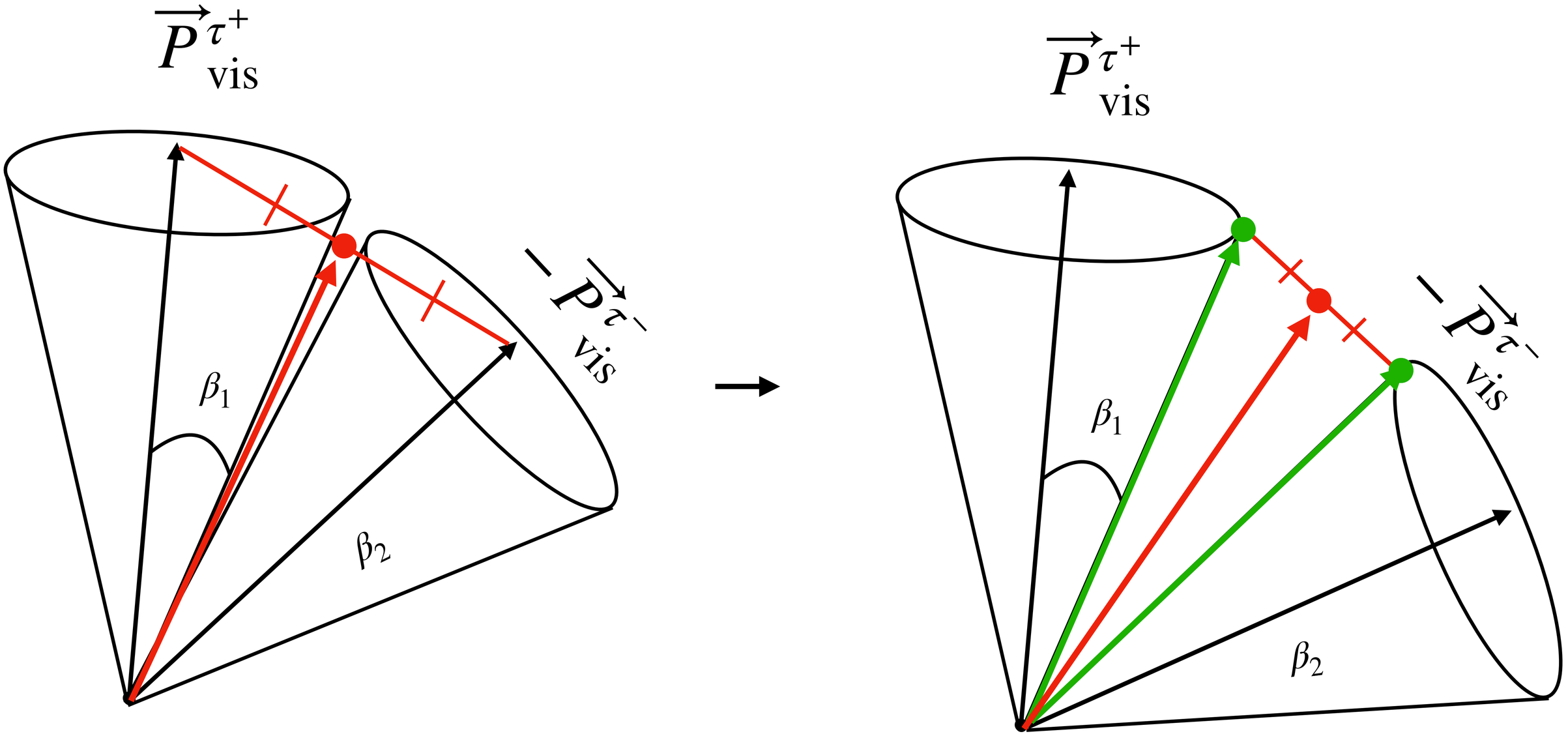
NO solutions

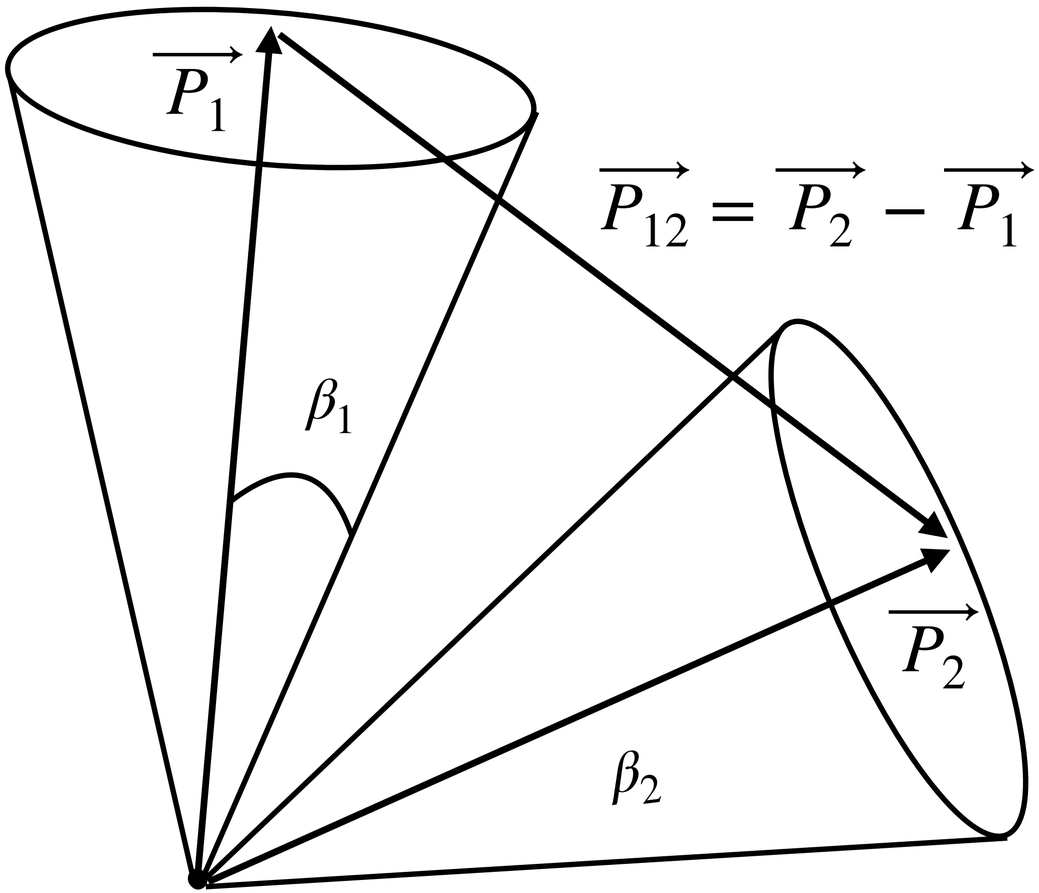
red line:solution = candidate tau direction

"Midpoint method"

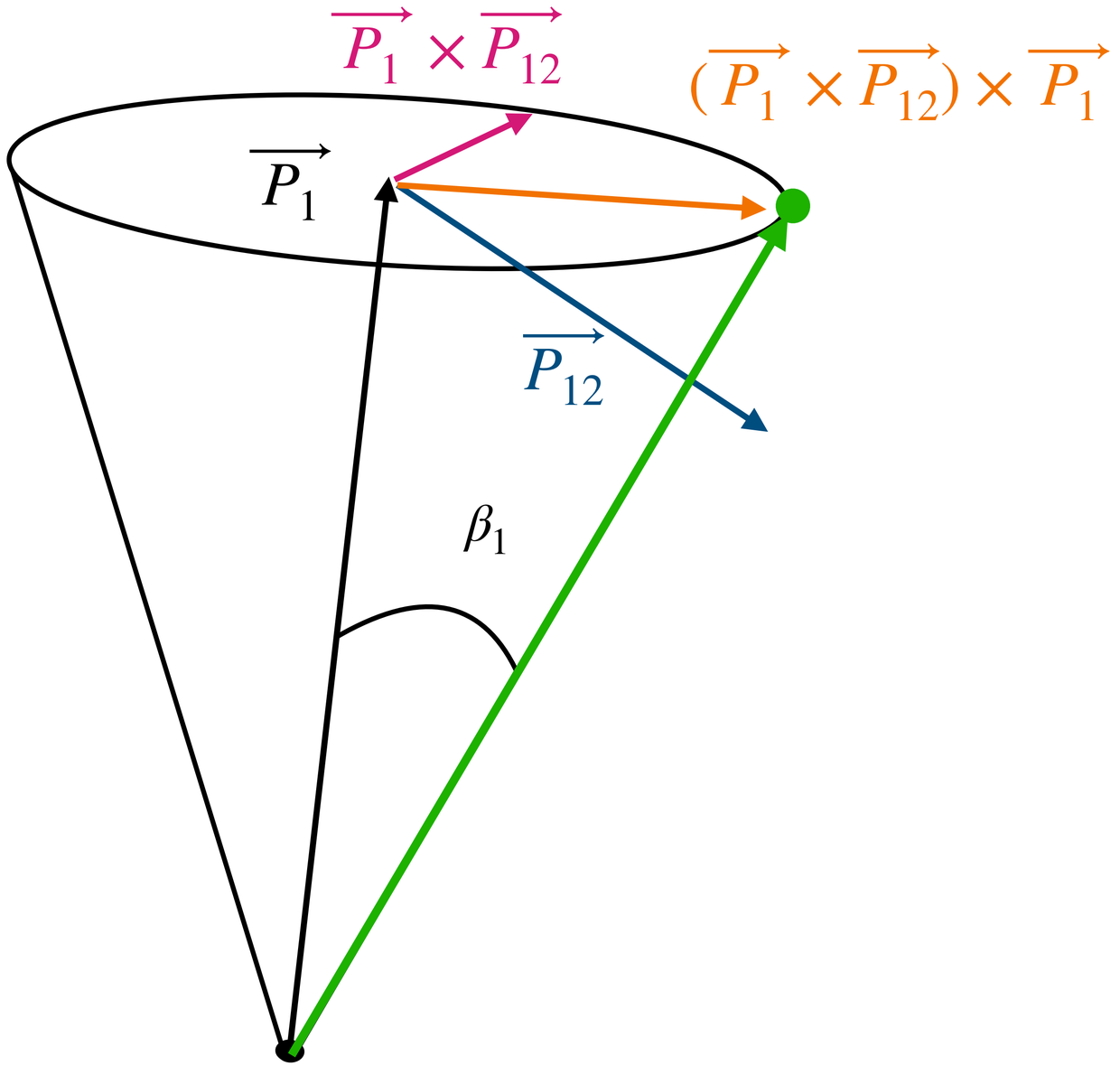
take a midpoint of visible daughters

take a midpoint of cone surface
and use this new vector as a solution





$$\overrightarrow{P_{12}} = \overrightarrow{P_2} - \overrightarrow{P_1}$$



$$\text{solution} = \overrightarrow{P_1} + |\overrightarrow{P_1}| \tan\beta_1 \, (\overrightarrow{P_1} \times \overrightarrow{P_{12}}) \times \overrightarrow{P_1}$$