

Validation of 2f-leptonic testsamples

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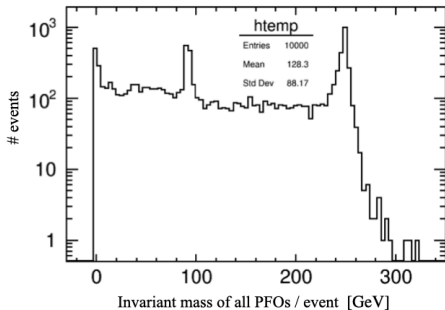
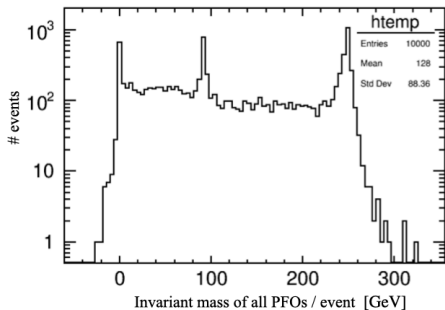
Introduction

- 2f-leptonic sample
rv02-01.sv02-01.mILD_I5_o1_v02_nobg.E250-SetA.I499997
.P2f_z.l.eL.pR.n000.d_dstm_14705_0.slcio
- Check tau-tau property (MC/PFO)

Photon-like PFO

sometimes PFOs have a “negative” invariant mass.

This was a problem in the new photon energy correction processor: it is now fixed.



- We found the problem.

MC spin information in the 2f_Z_leptonic sample

the events with Z_0 , the tau helicity information is not filled

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vertex x,   y   ,   z   | endpoint x,   y   ,   z   |   mass | charge |           spin           |
0.00e+00, 0.00e+00,-6.79e-02| 1.32e-01,-1.74e-01, 2.02e-01| 1.78e+00| 1.00e+00| 0.00e+00, 0.00e+00, 0.00e+00|
0.00e+00, 0.00e+00,-6.79e-02|-8.87e-02, 1.29e-01,-3.63e-01| 1.78e+00|-1.00e+00| 0.00e+00, 0.00e+00, 0.00e+00|

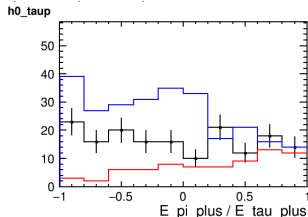
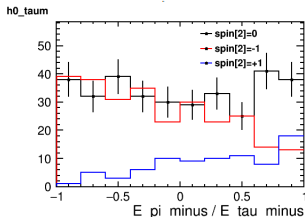
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the events with no Z_0 , information is present

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0.00e+00, 0.00e+00,-2.16e-02| 0.00e+00, 0.00e+00,-2.16e-02| 1.78e+00| 1.00e+00| 0.00e+00, 0.00e+00,-1.00e+00|
0.00e+00, 0.00e+00,-2.16e-02| 0.00e+00, 0.00e+00,-2.16e-02| 1.78e+00|-1.00e+00| 0.00e+00, 0.00e+00, 1.00e+00|

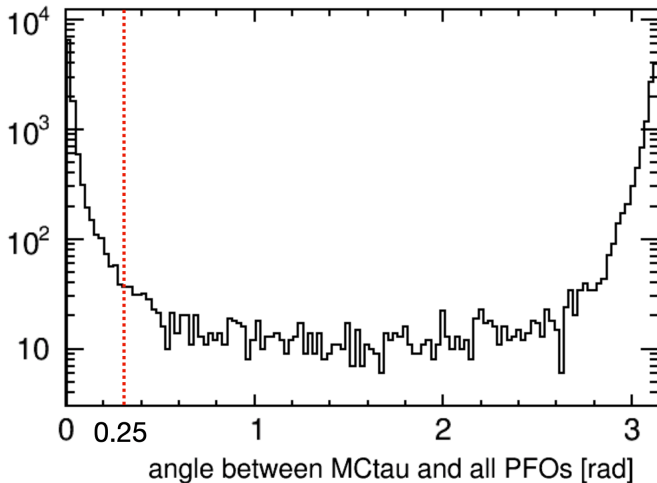
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WHIZARD authors are now working on fixing this.

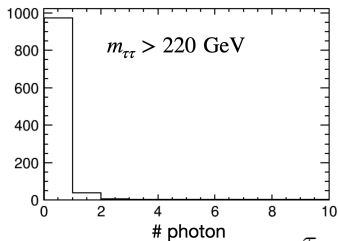
method

Make cone around MC tau direction with an opening angle of 0.25 rad.
We looked at PFOs inside cones.

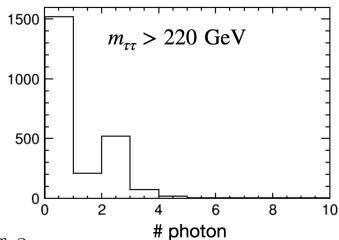


number of photon / each τ decay mode

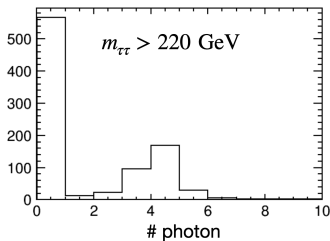
$\tau \rightarrow \pi\nu$



$\tau \rightarrow \rho\nu$



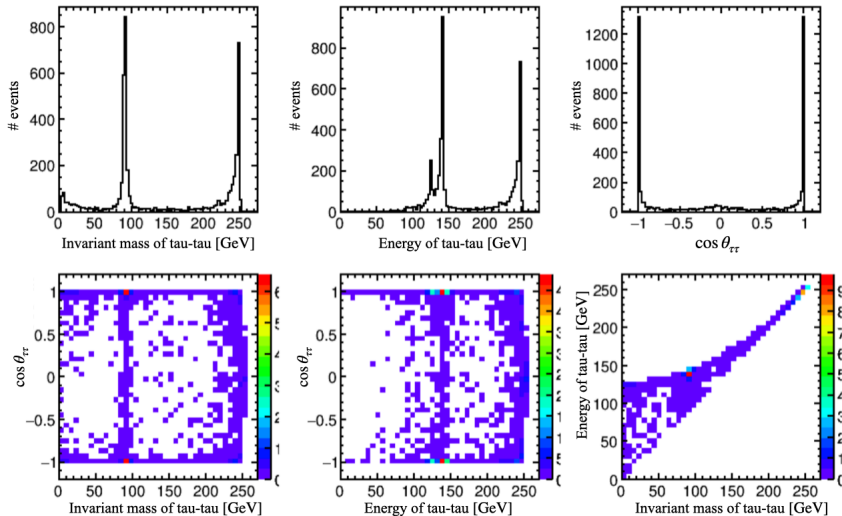
$\tau \rightarrow 1 - \text{prong } a_1$



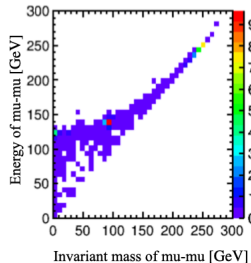
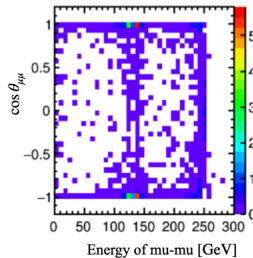
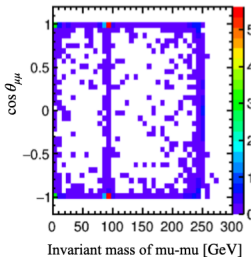
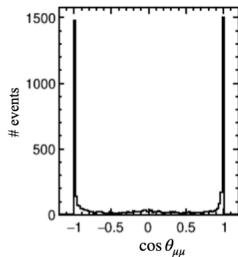
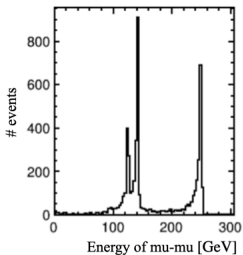
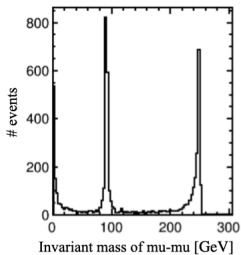
Summary

- New Tau testsamples was checked.
- Problem of tau spin information was found.
 - WHIZARD authors are now working on fixing this.
- There is no other problem found so far.
- I continue to study with new testsamples.

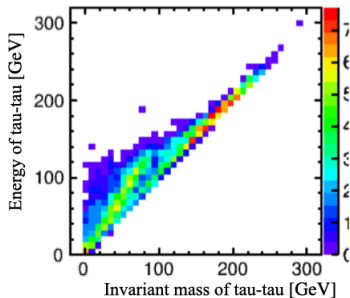
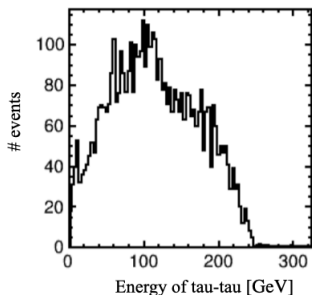
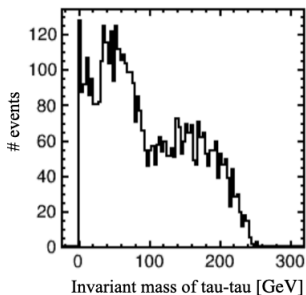
$$e^+e^- \rightarrow \tau^+\tau^-, \text{ MC}$$



$e^+e^- \rightarrow \mu^+\mu^-$, MC level



$e^+e^- \rightarrow \tau^+\tau^-$, PFO



$e^+e^- \rightarrow \mu^+\mu^-$, PFO

