

$h \rightarrow \tau^+ \tau^-$ BR Study

Performance of tau finder for 500 GeV $\nu\bar{\nu}h$

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Tau finder study

- I checked the performance of tau finder (for 500 GeV $\nu\bar{\nu}h$) with using MC matching.
 - Is a τ^- (τ^+) really reconstructed as a τ^- (τ^+) ?
 - try to understand the reason of mis-finding
- I applied MC matching to most energetic τ^- (τ^+).

Procedure for τ^-

1. Get energetic τ^- and get each particle in τ^-
 2. Apply MC matching for each particle in τ^-
 1. Is the parent τ ?
 2. If τ , is it τ^- or τ^+ ?
 3. If τ^- , is the parent of τ^- really Higgs?
- Applied same procedure for τ^+ (of course the charge is opposite)

Matching results

## particle in τ^-	1	2	3	4
charged	18220	0	74	494
neutral	20652	0	138	1070

the parent of a particle is...

- 1: τ^- and Higgs (GOOD!)
- 2: τ^- , but not Higgs
- 3: τ^+
- 4: overlaid object

## particle in τ^+	1	2	3	4
charged	18360	0	83	469
neutral	20665	0	157	1169

the parent of a particle is...

- 1: τ^+ and Higgs (GOOD!)
- 2: τ^+ , but not Higgs
- 3: τ^-
- 4: overlaid object

Results

- Tau finding (in 500 GeV $\nu\bar{\nu}h$) is working well.
- The reason of mis-finding mostly comes from overlaid process.

Summary & Plans

- I checked the tau finder performance for 500 GeV $\nu\bar{\nu}h$.
- Tau finding works well, mis-finding mostly comes from overlaid process.
 - try to improve if possible
- Next step: Event generation with proper tau polarization (maybe starts at 250 GeV)
- I submitted the abstract for JPS meeting. (Deadline is today.)