

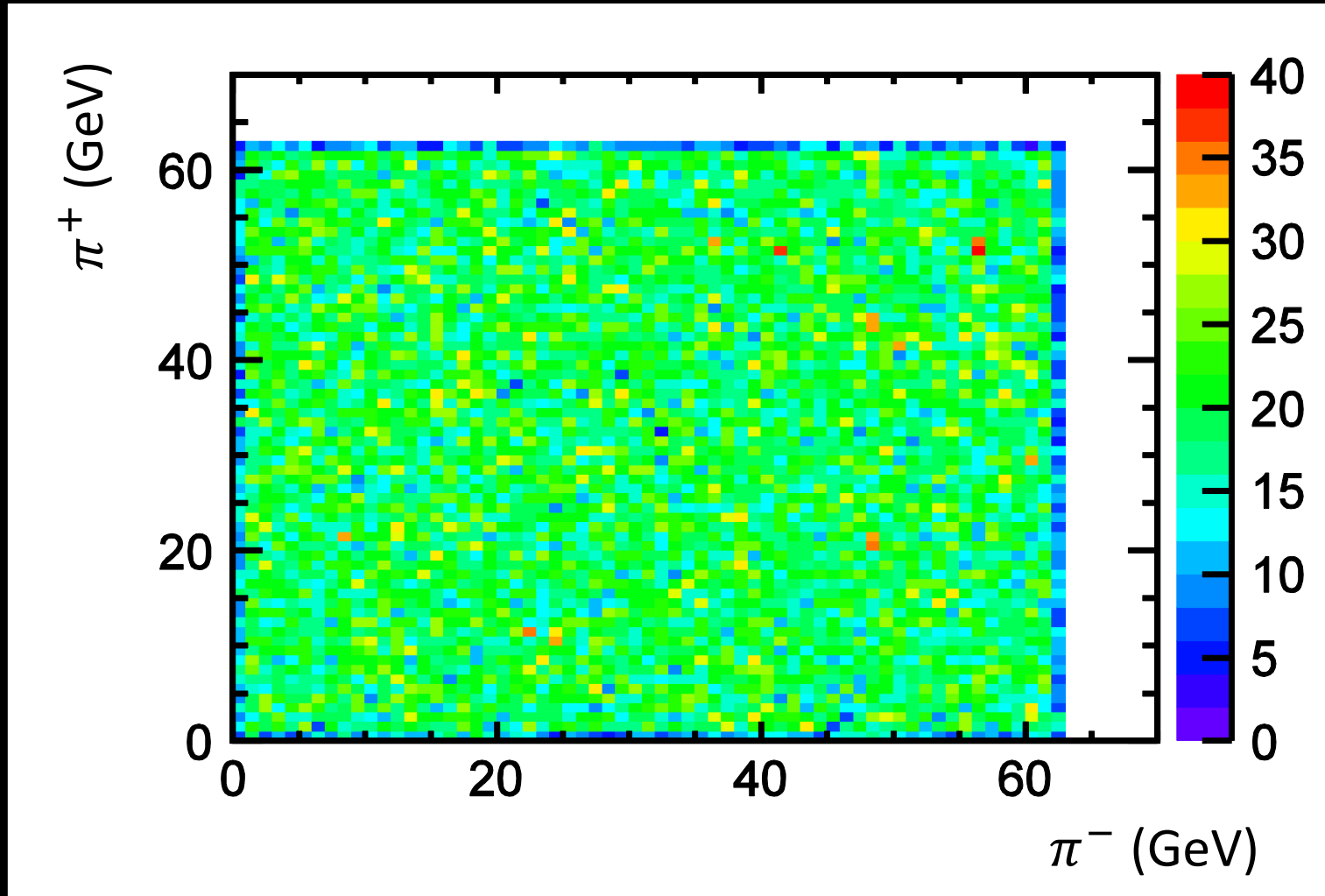
$h \rightarrow \tau^+ \tau^-$  BR Study  
New Event Samples

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# Tau polarization

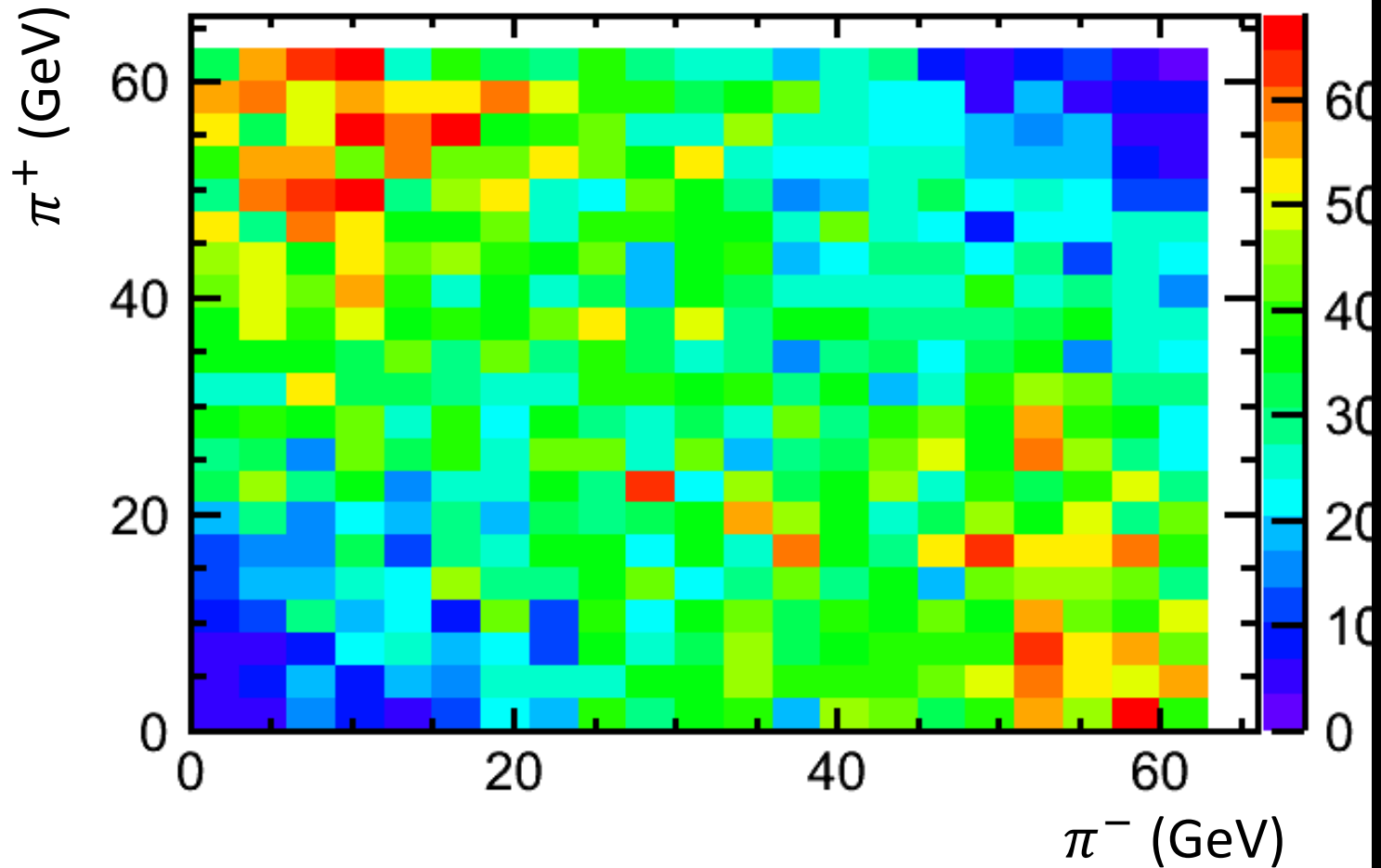
- TDR samples are not included tau polarization in  $h \rightarrow \tau^+ \tau^-$  decay.
- Yokoyama-san kindly produced new generator which including tau polarization properly.
  - Using GRACE (BASES/SPRING)
- I checked the energy distribution to confirm the polarization is really included.
  - Using  $h \rightarrow \tau^+ \tau^-$  and both  $\tau \rightarrow \pi \nu$ , and checked the  $\pi$  energy in Higgs rest frame. The  $\pi$  energy should be correlated.

# TDR configuration (500 GeV) (bin width = 1 GeV)



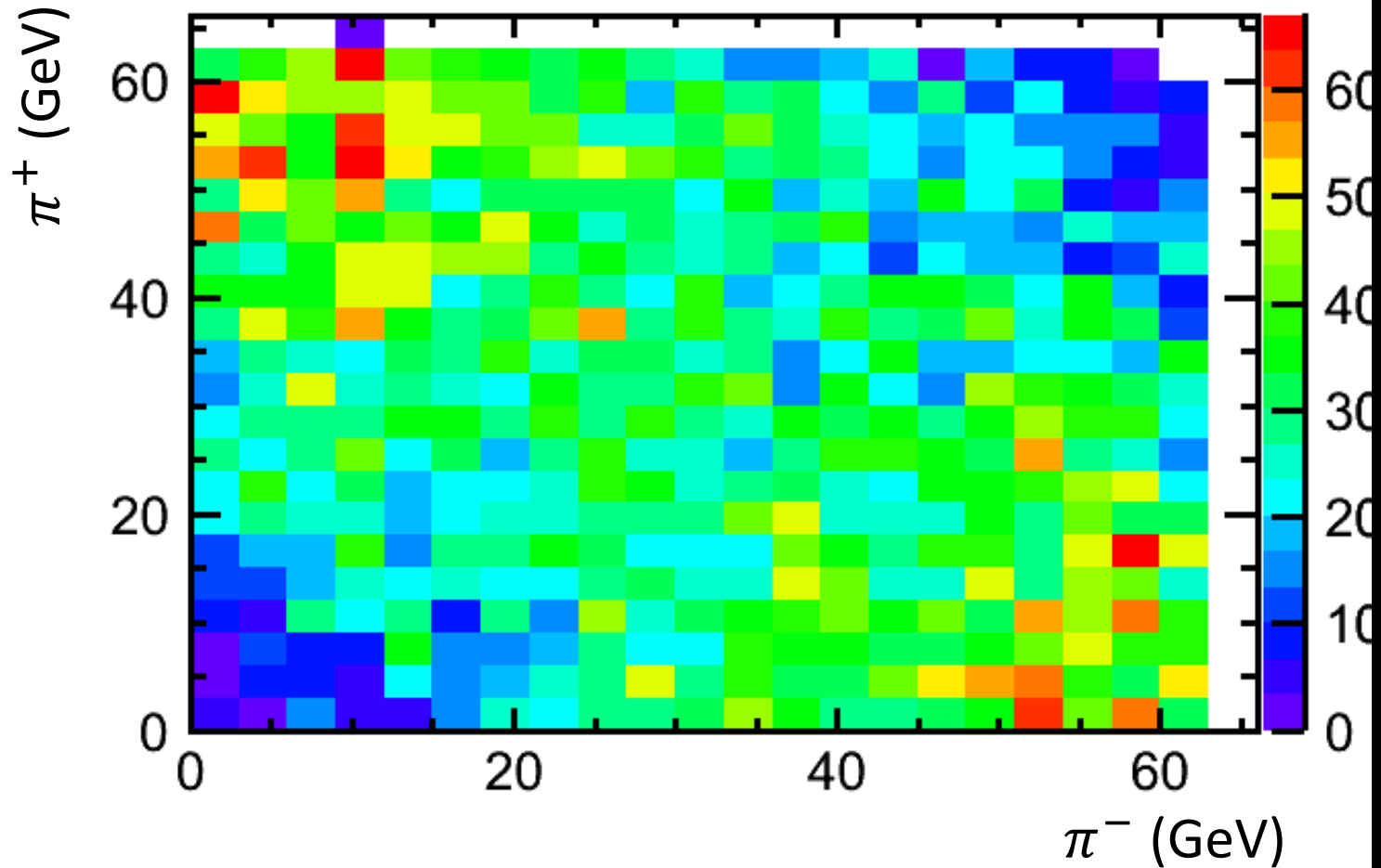
# New sample (250 GeV) (bin width = 3 GeV)

tau2\_daughter\_E\_boost:tau1\_daughter\_E\_boost(abs(tau1\_daughter\_PDG)==211&&abs(tau2\_daughter\_PDG)==211)



# New sample (500 GeV) (bin width = 3 GeV)

tau2\_daughter\_E\_boost:tau1\_daughter\_E\_boost(abs(tau1\_daughter\_PDG)==211&&abs(tau2\_daughter\_PDG)==211)



# Summary & Next plans

- Now I have new samples which contains proper tau polarization at stdhep level.
- Plan 1: full detector simulation with Mokka/Marlin <--- now running...
- Plan 2: tau finder (for  $q\bar{q}h$ ) study and optimization when doing Plan 1