

Estonia and CMS

Mario Kadastik

Personnel

Experimentators group has been growing steadily

- 2 Senior researchers (Mario, Christian)
- 5 post-docs (both analysis and upgrade work)
- 3 PhD students
- 1 MSc student

Besides that we also have a large theory group, who we collaborate with regularly

- 7 senior researchers
- 7 Post-docs
- 4 PhD students
- 4 MSc etc students

Grants wise we have a Center of Excellency until 2023, we have the yearly CMS related budget line, we have a Group grant, which started 2019 for the ttH/HH analysis and we have a grant for trigger work currently being evaluated

Analysis of H boson production via tt fusion process

Measurement of H boson coupling to top quark, search for CP violation in top-H coupling, search for flavor-changing neutral current interactions

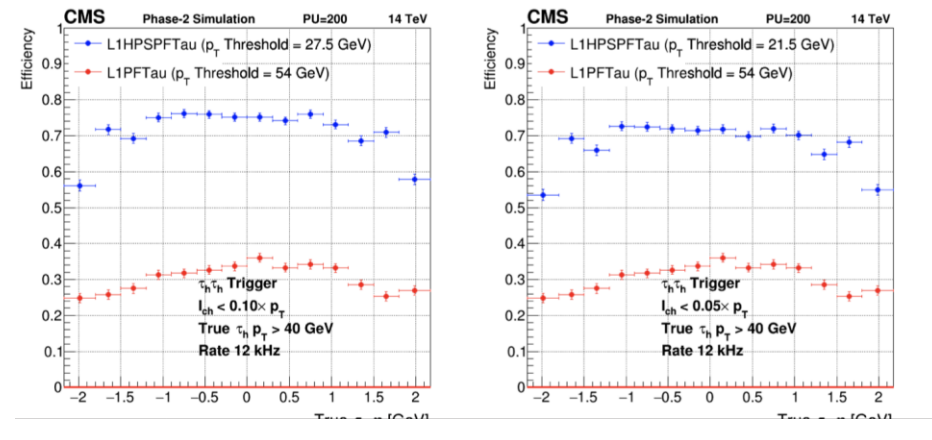
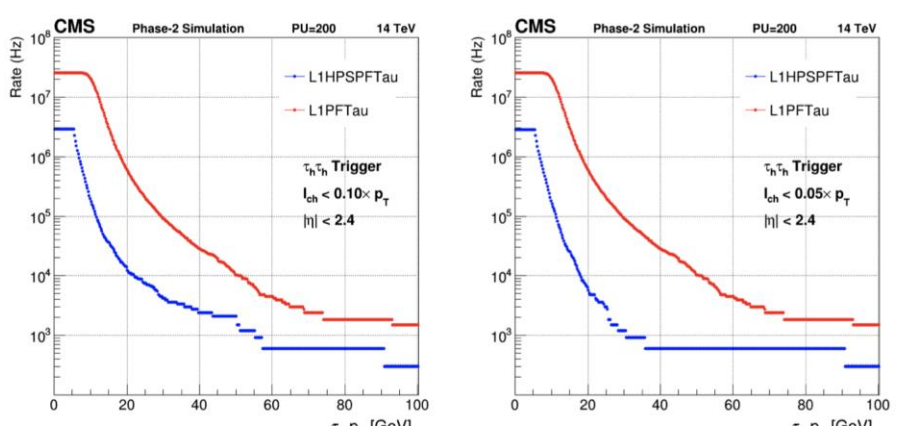
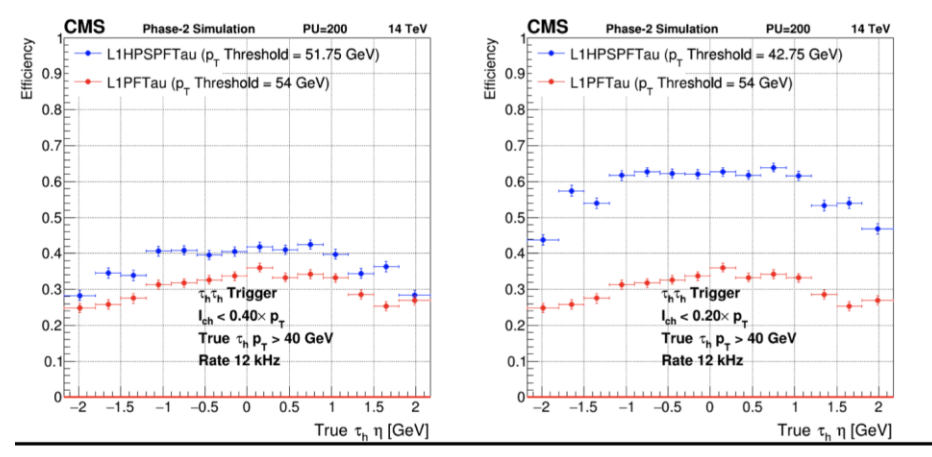
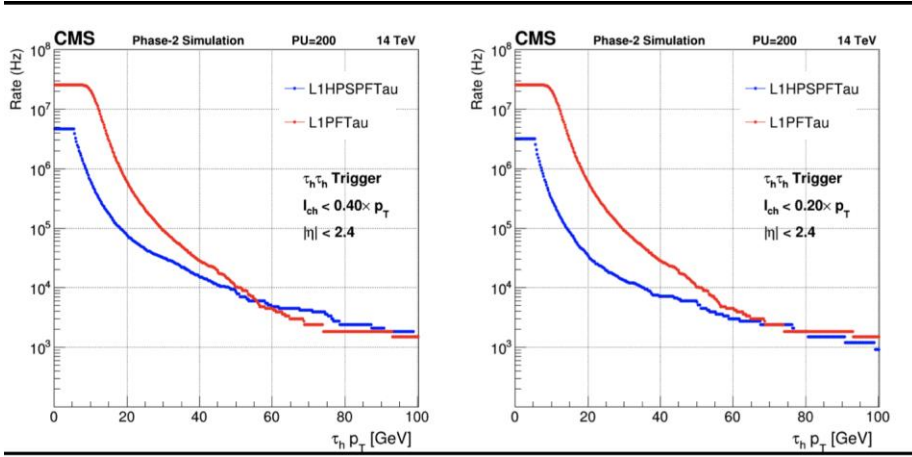
Analysis of H boson-pair production

Measurement of HH production rate in $HH \rightarrow bbWW$ and $HH \rightarrow WWWW$, $WW\tau\tau$, and $\tau\tau\tau\tau$ decay modes

Development of trigger algo for HL-LHC programme

Development of trigger for τ lepton pairs based on tracking and particle-flow event reconstruction for each proton-proton collision, at a rate of 40 million times per second, using fast electronics

Work on trigger



Hardware plans

New algorithm is useful and needed for HL-LHC data taking, we gain the most in our analysis efforts

New algorithm seems to be performing better than the current planned PFTau algorithm allowing lower thresholds at L1 (~20 GeV instead of ~50 GeV)

Need to port and validate algo in FPGA, cooperation starting with TalTech on this

Expect Estonian upgrade contribution to be mostly paid in-kind through procurement and testing of electronics boards for the upgrade