

Trigger Exercise - PO&DAS 2023

- **People:**
 - Confirmed: Artur Lobanov, Juliette Alimena, Sanu Varghese
- **Ideas for talk on the first day(s):**
 - Introduce basic concepts of L1 and HLT
 - Highlight new Run 3 triggers
 - Questions we have for organizers:
 - Part of a larger talk?
 - Should we provide slides?
 - How long? When will it be given?
 - Who gives it?
- **2 hour exercise**, repeated 3 or 4 times → every student will see our exercise
- Will adapt the CERN DAS trigger exercise from this year to only use nanoAOD and SWAN
 - Need to move it from nanoAOD-tools to columnar analysis? Or what are other people using? (We should sync among ourselves)
- **Focus on 2 HLT efficiency short exercises:**
 - Calculate MET trigger efficiency using orthogonal datasets
 - Calculate single muon trigger efficiency using tag and probe
- Provide bonus material (list of references):
 - L1 trigger efficiency study
 - How to calculate lumi for a trigger
 - Find trigger rates on OMS
 - Most recent trigger tutorials

Additional slide

- If needed, we could ask: Tobias Quadfasel (he developed all the timing tools for Run 3), Manuel Sommerhalder (he developed the new multi run harvesting tool for Run 3). Other UHH students involved with trigger are finishing thesis... (Finn Labe did a B2G trigger tutorial for HLT-level efficiency measurements)
- The intro presentation should cover:
 - **What does everyone need to know?** (L1 and HLT)
 - What is L1 and HLT? What is an HLT path? Which objects do we trigger on? What are prescales (and columns), trigger menus, trigger paths? Who uses which triggers and why? How do you use a trigger in your analysis? How do you get your data? How are primary datasets defined? How do you know when your trigger was active, and how much lumi it took? What are different kinds of trigger paths (signal, backup, control)? What is the L1T (DPG,...) and the TSG? How do I apply my trigger to MC? What is a L1 seed? How do you find your trigger efficiency and turnon curve?
 - (Artur): how to find whether the trigger of interests was prescaled or not (I think Sam Harper has some tool for that - via OMS API?)
- **We will provide bonus material to answer:**
 - **What do you need to know if you're developing a new trigger?** (L1 and HLT)
 - L1
 - terminology: trigger primitive, EMTF, BMTF, OMTF,
 - HLT
 - Rates (pure rates, PU dependency), efficiencies, CPU/GPU timing, monitoring and validation
 - Tools: confDB, etc
 - Mention skims