Discussion on:
MC challenges at high lumi/energy - LHC

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MC Challenges : Physics

- (N)NLO+ fixed order precision & accuracy for QCD (tree-level and loop-induced)
- NLO+PS for EW and (two-loop) mixed QCD-EW corrections
- Accuracy and precision of the PS resummation (NLL and more)
- Modeling/measurements of non-perturbative effects (PDFs, fragmentation, UE)
- Bulk vs High-pT/boosted topologies
- Exclusive multi-jet final states at NLO
- New Physics modeling : new particles and interactions
- Dedicated developments for specific high precision measurements of in the SM ($m_W,m_t,$...)
- Dedicated developments for new phenomena (eg long-lived particles)
- ...

Theory/technical effort. Collaboration between TH and MC developers, mostly
MC Challenges: Technicalia

- Efficient generation for SM mass production (tails vs bulk)
- Built-in event-by-event reliable estimation of the different type of uncertainties
- New techniques and improved accuracy/precision imply negative weights
- MVAs and New Analysis techniques
- New Physics parameter scanning (UV models, Simplified Models, EFT)
- Legacy and recasting tools
- ...

This is mostly work for MC developers.
Collaboration with TH/EXP on MVAs and recasting tools.
MC Challenges: Computing

- Grid evolution
- Exploitation of new computing architectures (MIP, GPU’s, QC?)
- Exploitation of new ML techniques
- Efficient storage and retrieval of samples (going beyond the LHE format?)
- Common New Physics MC samples for both experiments
- ...

Breakthroughs need an interdisciplinary approach (physics and computing)
Proposal: have a dedicated series of meetings/workshops on this topic