

MC status at CMS and questions

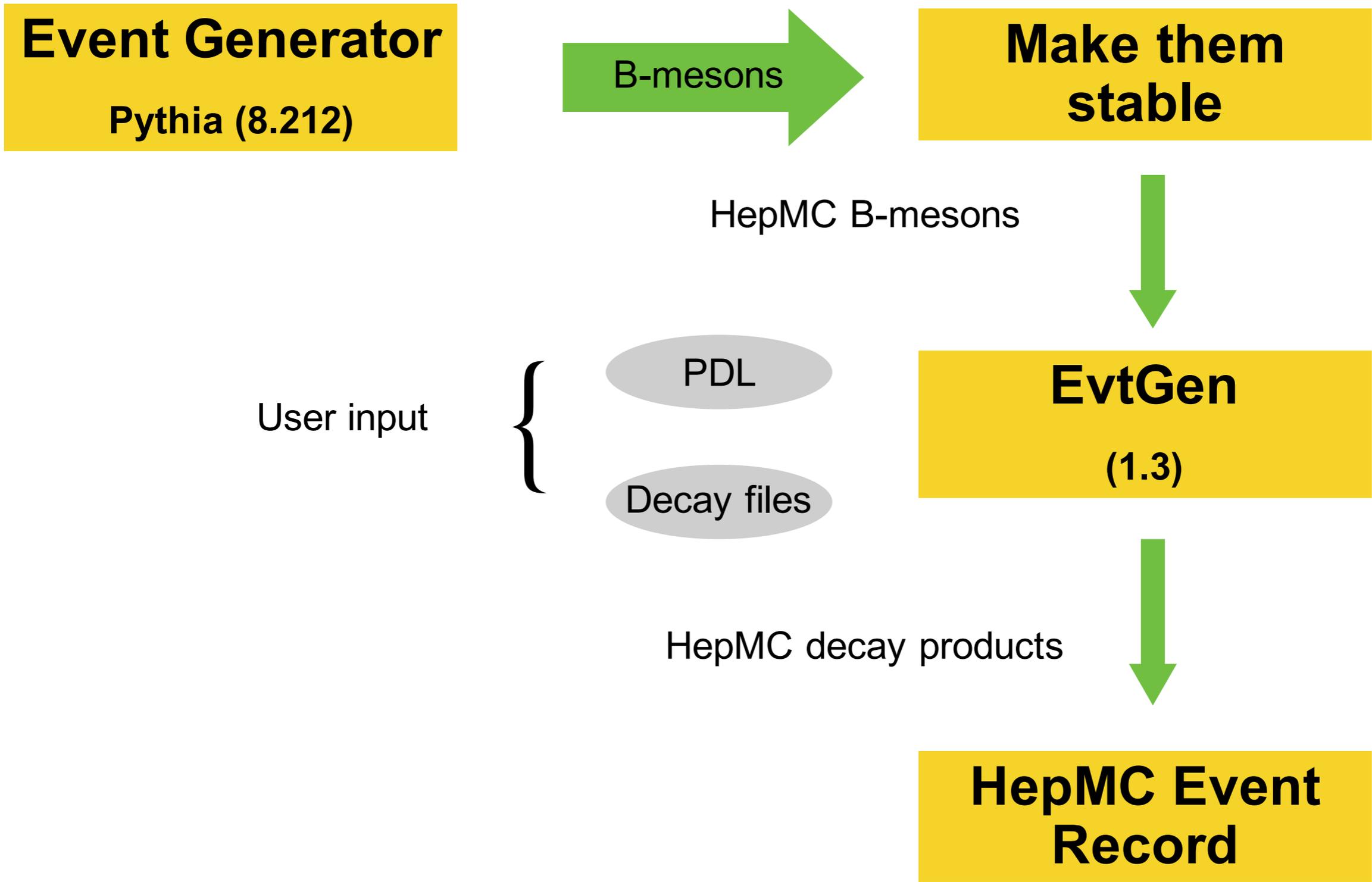
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Disclaimer



Apart from presenting the current status of EvtGen in CMS, I will be given or even asking few things that I worried about for MC and not just for EvtGen, this list of things are not just my worries but from all other colleagues.



For generating signals, (a given decay = forced decay) we use the “Alias” particles, which can be:

- ✓ particles part of the decay of another EvtGen alias
 - User just need to provide the decay file, no other action is required
- ✓ particles produced by PYTHIA
 - Typical only one signal per event is expected, so If more than one in the event, only one is randomly picked as the alias, the others are decayed normally
- ✓ particles part of an EvtGen decay where the mother is NOT an alias (e.g. $B^* \rightarrow B\gamma$, $B \rightarrow \text{signal}$)
 - Since EvtGen generates the initial decay: daughters are scanned and, if aliases are found, their products are remove and re-generated
- Last two cases are adjusted by the user providing the
 - `list_forced_decays = cms.vstring()`



Procedures within CMS



- Being CMS a multi-purposes experiment, has to deal with several requirements at once.
- Implementing a new software cycle or a patch in the generators may be not “fast” enough, since several steps need to be meet (implementation, validation, approval, etc.) before actually going into production.
- EvtGen 1.5 is scheduled to run in the next MC production cycle.



Is EvtGen upto date?



Over the last weeks (months) we have heard that even the latest public version from Warwick is not the last one.

We have also heard that LHCb have found few bugs.

So, we are wondering if this kind of findings were published by official means.



Is EvtGen upto date?



LHCb has done a tremendous job developing a lot new models, like those for $B \rightarrow \mu \mu \gamma$ or the model for semileptonic decays of Λ_b , available in LHCb software as “EvtGenExtras”.

Wondering if this can be propagate to the official trunk of EvtGen.



Is EvtGen update?



I had received many inquiries from my colleagues why the particle properties and decay table is not synchronized with latest experimental measurements.

I understand this is not trivial task and maybe is not good to have each experiment with their own tables. Can we work more closely on this to have all the most up to date tables?.



Going beyond EvtGen, we should agree how to deal on how to setup pythia to have (momentum) fragmentation models which better describe data (sorry if this is well know for pythia8), but in pythia6 we have to weight MC

Also we should make sure all are using a consistent setup for "flavor fragmentation" (i.e. fs/fu/fd/...)

Also would like to know if we can have a consistent way to determine the pt/eta dependence of fs/fu covering the full phase space of ATLAS/CMS/LHCb



Over the last weeks we have been suffering with the production of signal samples. Generation efficiencies are quite low. Since only about one event is accepted every 100000 because we start from generic QCD to properly simulate b-hadron rates and kinematic distributions and then we apply very tight kinematic filter on stable particles in order to match trigger/reconstruction thresholds. I would like to know how this is dealt in LHCb or ATLAS?

Any hint is welcome.

We currently are trying to develop an approach which decouples pythia and EvtGen, generate a HUGE pythia dataset and then reuse that for the signal generated by EvtGen.

- Main tool for BPH at CMS
 - Event generators: Pythia8, BCVEGPY + EvtGen
 - Standard versions, no special modifications
 - Currently using version 8.212, 2.2 and 1.3 respectively
 - For RunII CMS is using Warwick EvteGen version as default, with no further modifications
 - EvtGen 1.5 is schedule for the next production cycle.



Backup

