# Computing resources for $B \to K^{(*)} \nu\nu$ in FastSim

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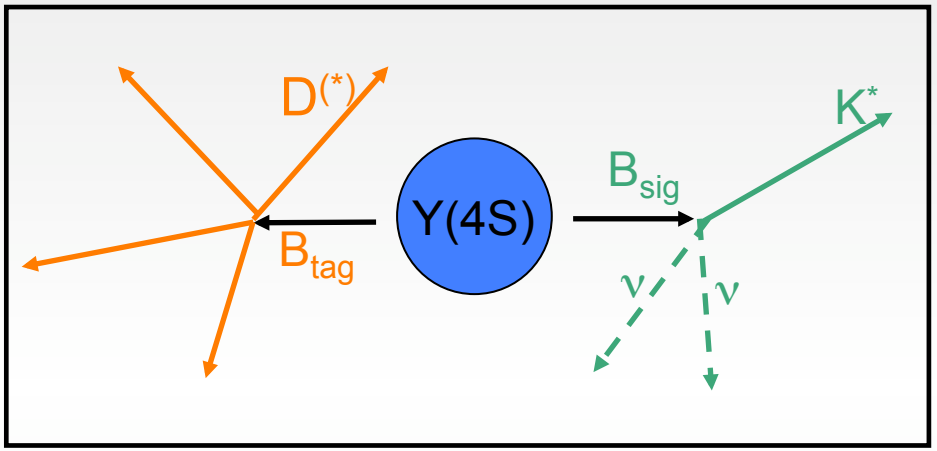
# $B \to K^{(*)} \nu\nu$ analyses

1. $B_{tag}$ reconstruction:

Full reconstruction of one B meson in hadronic or semileptonic decays. (Btag reconstruction + selection efficiency $O(10^{-2} \div 10^{-3})$)




2. $B_{sig}$ reconstruction:

look for a K* not accompanied by additional (charged or neutral) particles + missing energy (Bsig+Btag selection efficiency $O(10^{-4} \div 10^{-5})$)

# 1) statistics for the January production

- ✓ is the foreseen 1 ab-1 reasonable for your analysis ?

  yes this is a reasonable sample both for the SL and hadronic analyses

- ✓ what generic processes are you interested to have simulated in Fast Sim ?
  - B0B0_generic
  - B+B-_generic
  - ccbar
  - uds
  - tautau
  - B→SL vs. B→generic

# 2) machine bkg sources

- ✓ which one are the most relevant for the results of your analysis?

Sensible to background which produces neutral hitting the calorimeter: beamstrhalung, out of time bhabha clustesrs, two photon events backgrounds. Effects producing fake tracks shouldn't be an issue.

# 3) CPU budget

- how long does it take to apply your analysis to
  - generic events w/o bkg ?
  - generic events w/ bkg ?

Please specify if possible the CPU model used to run the jobs.

HAD analysis as run in September, with machine background (50X beamstrahlung with neutrons enabled): 0.35-0.38 <sec>/events for generic BB events, depending on the detector geometry model; same estimate to run without background (previous production); 0.15 <sec>/events for signal MC (w/o background)

SL analysis ("private" production, w/o background): 0.20 <sec>/events for generic BB; 0.08 <sec>/events for signal MC events

# 4) Disk budget

- ✓ what information do you store on disk for each event as outcome of your analysis ?

recoil specific variables (mES, deltaE, cosBY,...), UsrDataVariables (B decayMode,..), usual BtaTupleMaker blocks, i.e. :

```
    ntpBlockContents set "Y    : MCIdx Mass Momentum CMMomentum Vertex VtxChi2 nDaughters UsrData(TagB_BToDlnu,SigB_
BToDlnu)"
    ntpBlockContents set "B    : MCIdx Mass Momentum CMMomentum Vertex VtxChi2 nDaughters"
    ntpBlockContents set "D    : MCIdx Mass Momentum CMMomentum Vertex VtxChi2 nDaughters"
    ntpBlockContents set "h    : MCIdx Mass Momentum CMMomentum Vertex VtxChi2 nDaughters"
    ntpBlockContents set "l    : MCIdx Mass Momentum CMMomentum Vertex VtxChi2 Doca DocaXY Poca PocaXY PocaErr PocaC
ov nDaughters"
```

HAD analysis: 433 vars (Bsig+Btag info), SL analysis: 1 ntuple with Bsig+Btag variables (366 vars) + 1 ntuple with Btag varaibles only (28 vars)

We can: reduce the number of variables; produce, for both analysis two ntuples: one (small) with Btag variables another with both Btag and Bsig infos, without events in which no Bsig has been reconstructed

- ✓ how much disk space is need per event on average ?

HAD analysis : 5.5 KB

SL analysis: 4.2 KB

# 5) Event selection

- To reduce the amount of CPU time spent and the space occupied on disk, one could consider to filter the events while they are being processed;
  is it feasible, for events you are not interested in, to filter them out:
  - at the generator level ?
  - after background mixing has taken place ?
  - at some later steps in the analysis ?
  - before writing the results on disk ?
  - what would be the anticipated filtering fractions ?

We plan to add a filter at reconstruction level, probably based on some kinematic variable. Is there an expected rate to be reached using the filter?