BB-generic representative cocktails: status report

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Status of BB-cocktails for $B \to K^{(*)}\nu\nu$ (SL)

- **Performed B-background characterization studies for the $B \to K^{(*)}\nu\nu$ analyses**
- **A detailed summary of the results for the different modes can be found at http://www.slac.stanford.edu/~aperez/SuperB/Bkg_characterization/ (see also my talk at Elba SuperB workshop, DGWG session)**
- **Cocktails of BB-decays (dec files) representative of BB-background and signal samples for the $B \to K^{(*)}\nu\nu$ analyses are now in ProdDecayFiles and GeneratorScripts packages**
  - BB-background representative samples: (~25%x50%) = 13% of total BBbar BR

    $B \to D^{(*)}l\nu$/Bbar$\to$($D^{(*)}l\nu$ + Cocktail of hadronic decays)

    B0B0bar_Btag-SL_e_mu_tau_Bsig-HD_SL_Cocktail.dec

    B+B-_Btag-SL_e_mu_tau_Bsig-HD_SL_Cocktail.dec
  - Signal-representative samples:

    $B \to D^{(*)}l\nu$/Bbar$\to$Signal mode (e.g. $K^+\nu\nu$, B+B-_K+nunu_SL_e_mu_tau.dec)
- **Quick test generating (50k evts) BB-generic and cocktails shows that we gain a factor of 5-6 in the ratio = (N-evts recorded at n-tuple)/(execution time)**
- **Similar gains are obtained with the signal-representative samples**

Status of BB-cocktails for $B \to K^{(*)}\nu\nu$ (SL)

- **Some Issues :**
  - Some modes found in the BB-generic samples (3-body decays and higher) are not in the list of generic B-decays (4-17% of the total B-bkg modes found), e.g:

    $B^+ \to D^0 \rho^+ \pi^0$, $D^0 K^+ K^0$, ...; $B^0 \to D^- K^+ K^0$, $D^{*-} K^+ K^0$, ... (JETSET, hadronic decays)

    DECAY.DEC file:

    0.225266 u anti-d anti-c u JETSET 48;
    0.04300 u anti-d anti-c u JETSET 13;
    0.02250 u anti-s anti-c u JETSET 13;
    0.07400 c anti-s anti-c u JETSET 13;
    .....

  - **The Idea:**

    - Generate BB-events where one B decays to a generic hadronic decay (JETSET) and the other to a simple decay mode (I choose $B \to \pi\pi$ charged and neutral)
    - Store all generated events and look only at the true information
    - Estimate the BR of those modes as N-evts(mode)/Ntotal-generated
    - Include this mode in the cocktail with the estimated BR and a phase space (PHSP) model
    - I already generated the charged and neutral samples, still need one more day to look at them, estimate the BRs and to include the modes in the cocktails

Status of BB-cocktails for $B \to K^{(*)}\nu\nu$ (HD)

- **From Elisa:**
  - **B-background characterization studies for the $B \to K^{(*)}\nu\nu$ analyses is finish**
  - **Cocktails have not been committed, still need to build the corresponding dec files**
  - **Elisa is busy right know. I can take her results and build the dec files**
  - **I can also include the non-listed modes (not found in DECAY.DEC) from my generation of JETSET decays**

Status of BB-cocktails for B→τν (SL)

- Contacted the BaBar people that did the latest B→τν (SL) analysis to get their n-tuples (BB-generic, Signal, qqbar), no answer up to date
- Only need a couple of days to do the background characterization studies and to build the dec files with the cocktails (maybe one more day for testing)
- I can also include the non-listed modes (not found in DECAY.DEC) from my generation of JETSET decays

Cocktails and analyses

- **The cocktails representatives of BB-generic built will work for all $B \to K^{(*)}\nu\nu$ analysis (SL) $\Rightarrow$ include the B-modes which are background to all analyses**
- **Can do the same thing for the $B \to K^{(*)}\nu\nu$ analysis (HD)**
- **HD and SL cocktails are completely independent:**
  - Signal-side of both HD and SL are very similar
  - Tag-sides are completely different
- **Still need to see if can create one cocktail that includes the background modes to $B \to \tau\nu$, or maybe an independent cocktail. Expect some overlap with $B \to K^{(*)}\nu\nu$**

Backup