== Towards first CMS publications on quarkonium production using di-muons ==

1. Trigger
   a. Study the best strategy to trigger J/Psi using single and di-muon triggers for different luminosity scenarios
      i. Establish the optimal thresholds and strategy to maximize signal purity and smallest error on the cross section.
   b. Set up the HLT code in collaboration with the Trigger working group.
   c. Study the trigger efficiencies with data
2. Skimming
   a. Provide the skimming code and distribution of the data sets to the T1 and T2 centres
   b. Develop a tool to keep track of the skimming efficiency per each data set
3. Event selection
   a. Onia2MuMu code development and maintenance: additional work currently being done or that needs to be done:
      i. Put the HLT information (done)
      ii. Storage of the different muon collections (global-muons, calo-muons, tracker-muons) - almost done
      iii. Quality flags for muon reconstruction and divided according to the barrel and endcaps
      iv. d0 and z0 of the tracks
      v. Primary vertex information (both in x-y and z) especially the z-coordinate when pileup events will happen, to reject muons not coming from the same primary vertex
      vi. MC truth matching w/o (done) and with PAT (to be done)
      vii. Store PF objects in Fastsim (done) and in full sim (to be done)
      viii. Store PAT objects in Fastsim (done) and in full sim (started?)
4. Analysis
   a. J/Psi classes (done)
   b. Signal and background extraction
      i. Mass fit parametrizations: need to study the dependence as a function of muon eta, pT-J/Psi and muon type.
      ii. Study background shape from same sign muons
      iii. Is a mass window cut more robust compared to a mass fit?
      iv. Absolute momentum scale determination studies
   c. Efficiency determination using a T&P approach
      i. Trigger
         1. Use single muon path to determine the trigger efficiency
      ii. Lepton reconstruction
         1. Idem as 1 above
         2. Tracking efficiency - apply tracker inefficiency map to MC
         3. Use CRAFT (2008 and 2009) to tune methods and check any problems from Tracker-Muon Chambers matching
      iii. J/Psi reconstruction
         1. Study the applicability of factorization of trigger and offline muon reconstruction efficiencies
         2. Study the effects of correlation using the MC
   d. Acceptance correction

i. Determine (MC) a systematic error on the acceptance from assuming several (reasonable, data-driven) J/psi polarization scenarios
ii. Study the effects of leptons going outside the acceptance regions in eta and pT

e. Luminosity computation on a run-by-run basis
i. Provide the (official) integrated luminosity pertinent to the data samples used in the quarkonium analyses
ii. Verify that the run selection is appropriate and check the data quality flags of the detector partitions, etc.
iii. Determine the skimming efficiencies and versioning

f. B-hadron content
i. Decay length parametrization and resolution functions
1. Fitting functions and resolution
a. Refine the information for different track categories (depending on the number of pixel hits and their location) and pT
b. Study the systematics of the alignment and compare data to the MC
2. Study the vertexing efficiency as a function of pT, eta and pileup
ii. Specific acceptance determination

Objectives for the analyses:

I. Redo prompt J/Psi and b->J/Psi analyses of PAS 07/02 using 10 TeV MC samples.
II. Use new J/Psi classes, using one global-muon and one tracker-muon or one calo-muon and define a strategy to reach lower pT_J/Psi as compared to two global-muons.
III. Improve low-pT J/psi trigger efficiency by using new trigger paths, including the single muon plus "back-to-back" track, with invariant mass around 3 GeV
IV. Monte Carlo samples:
A. Contact person for MC production (so far Zongchang Yang)
B. Study strategy for producing large fastsim samples without a muon pT cut
C. Keep track of detector efficiency maps to study efficiency correlations for double muons
V. List and carefully review all the factors entering in the determination of the cross sections (in micro barn) from the measured yields: which ones are measured on data? Or taken from MC?
VI. Study the muon and tracking performance with CRAFT (08, 09) data

===== Final remark ======

Although the mission of the task force is the delivery of the first CMS papers on quarkonia production, with the pp collision data collected during the first LHC runs, we are happy to collaborate with people interested in using the J/Psi and Upsilon resonances for other purposes, such as magnetic field calibration, detector alignment or performance studies, etc, if we can use common tools (software, files, etc).