

# AWG Ntuple content..

- Two examples
  - BReco
  - Charmless
- Completely different structure, but the two formats share common features
  - Both have generic structure
    - Essentially decay mode independent
    - Similar information content
      - Candidate level information
        - » A dump of the “micro”
        - » Calculated quantities
      - Event level information (mostly “micro”)

# BReco ntuple format

Event Block

B candidate Block

D\* candidate Block

.....Other subresonances

Charged track Block

Photon Block

- One entry per event
- As appropriate, each block contains pointers to daughter particles defined in other blocks
- All D\*/D/track/photon etc candidates regardless if used in B candidate or not.
- Blocks to be written are tcl configurable
- Adds to CompBaseNtpDump....
- 1 example was 10KB per B candidate

# “Charmless” ntuple format

Particle Block

B candidate Block

Event Block

Monte Carlo truth Block

- One entry per B candidate.
- A “particle” may be a resonance or a track/photon.
  - One entry in “particle block” per particle in B decay chain.
- Ntuple defined in NonCharmUser package

# Information beyond “micro” quantities

- Track/Photon level information
  - Results of Pid selectors
    - Bits and possibly floats (NN output for example)
- “Resonance” level information
  - Mass, momentum, etc
  - Results of vertex fit
- B candidates have significantly more added information
  - Presumably because these ntuples were designed for B decay analyses...

# B candidate information

- Kinematics
  - $m_{ES}$ ,  $\Delta E$ , mass, momentum
  - Vertex fit results
- Continuum suppression variables
  - (Every such variable known to man...)
  - Energy flow in angular cones
  - Thrust calculations
  - Neural network results
- Tagging
- Magic decay mode identifiers and daughter particle pointers/identifiers

# A different case: “semi-inclusive” analyses

- Another use of the “Breco” style of ntuple is semi-inclusive analyses such as  $B \rightarrow X_s \gamma$ 
  - Try to cover as much as possible of inclusive rate as sum of exclusive B decay channels
  - Lots of combinatorics
    - Store results of combinatorics in ntuple
    - Store multiple B candidates per event. Sort out the “correct” combination offline.
      - (Extreme example: 19/event with tail to 100)

# Conclusion

- Breco and charmless ntuples are good examples of ntuples designed to store generic B decay information
  - Essentially decay mode independent (minimize time designing ntuples)
    - Users may add bloated “generic common blocks” to the customizable micro, unless it is straightforward to add “customized” information.
- Categories of added information
  - Kinematic, results of vertex fit, tagging, and continuum suppression variables
  - Pid selector outputs
- Amount of unused information scales with pain/time to recreate..