Status of $B \to D^* r$

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$D^* r$ Strategy

- In Moriond we took all events peaking in m_{miss} to be "signal", with the signal lifetime distribution
- This is wrong, since z_{reco} is determined mostly by the "fast" pion π_f which, in peaking events, can come from the tag B (see Maha's talk 3 meetings ago).
- The strategy now is to divide each event type into a "good π_f" and a "bad π_f" sample. The shapes of each sample are determined by simultaneously fitting fully reconstructed events.

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The PDF

- Most on-resonance events are fit with the PDF (G/B=good/bad π_f): $F_{s,G} P_{s,G} + F_{s,B} P_{s,B} + F_{a1,G} P_{a1,G} + F_{a1.B} P_{a1,B} + F_{comb\ BB} P_{comb\ BB} + F_{qq} P_{qq}$
  - May need to add a small third category: π_f from missing D^0
- Off-resonance events are fit with P_{qq} and BB MC with $P_{comb\ BB}$
- Events fully reconstructed as $D^*\rho$ or D^*a_1 are fit with $F'_{t,X} P_{t,X} + F'_{qq} P_{qq}$ (t=s or a1, X=G or B, depending on whether the π_f in the partial reconstruction is the same as in the full reconstruction)
- Each PDF is a function of $m_{\pi 0} \times m_\rho \times m_{miss} \times fisher \times \Delta t$
  - Taking into account "correlation" between $m_{\pi 0}$ and m_ρ
  - In τ_B analysis might do away with $m_{\pi 0} \times m_\rho \times fisher$ for speed up)

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Exclusive Analysis

- Use Composition Tools to exclusively reconstruct $D^* r$ and $D^* a_1$ events. Vertex the B_{cp} then get D z using VtxTagBtaSelFit.

- Simple cuts
  - $M_B > 5.2$ GeV
  - $|DE| < 0.001$ GeV
  - $0.1425 < M_{D^*} - M_D < 0.1485$

Data Type	Efficiency (%)
Signal	1.5
$B^0\overline{B}^0$	0.26
Off-res	0

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Conclusions and Future Plans

- The exclusive reconstruction code seems to be working.
- Implement the exclusively reconstructed information in the inclusive analysis ntuple.
- Do the fit including the exclusive data sample.