

Initial Results for

$$PQ \rightarrow \overline{D_0\Lambda}$$

*Jimmy Proudfoot
Sept 10, 2004*

*With lots of help from Christoph
- Thanks!*

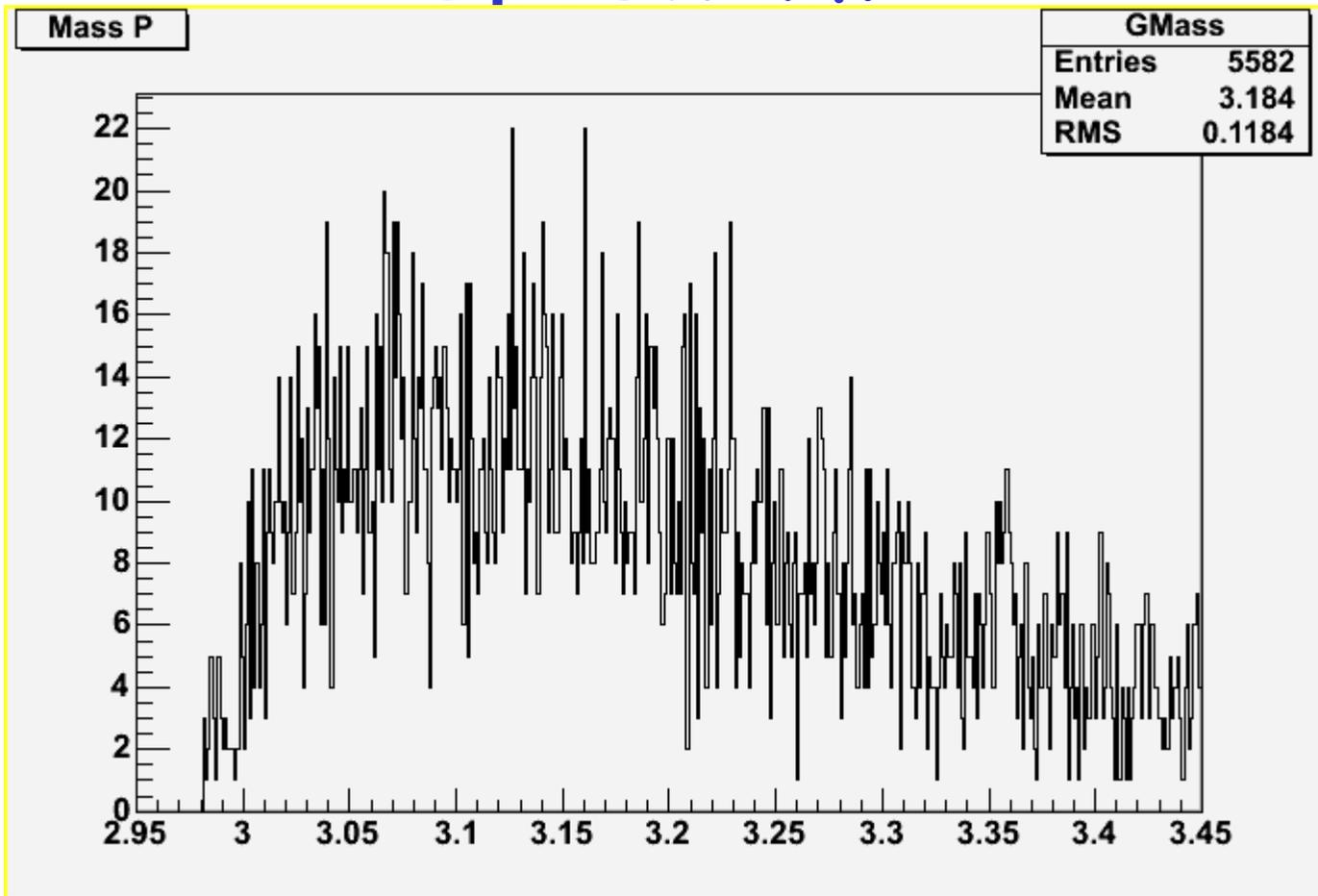
My Goals:

- Recover from being in the Operations Department
- Try to do something different (for me that is - not for most other people)
- Try not to make too many mistakes
- Learn something
- Hopefully actually contribute to a CDF analysis

$$PQ[udusc] \rightarrow \overline{D^0}\Lambda$$

- **Start from BStntuple**
 - Use scripts and tools provided by MIT group & Christoph
- **Pre-selection taken from BottomMods/Pent-mit-stn.tcl**
 - PQ pid 511, Λ pid 3122, D^0 pid 421
- **D^0 and Λ track selection:**
 - $P_+(track) > 2.0\text{GeV}$, $0.06 < L_{xy}(D^0) < 1.0\text{cm}$, $0.06 < L_{xy}(\Lambda) < 10.0\text{cm}$
 - $d0(D^0) < 0.008\text{cm}$, $1.489 < M(D^0) < 1.881\text{GeV}$
- **D^0 and Λ kinematic selection:**
 - $P_+(D^0) > 5\text{GeV}$, $P_+(\Lambda) > 2\text{GeV}$, $P_+(PQ) > 7\text{GeV}$
- **PQ Selection**
 - $P_+ > 7\text{GeV}$, fit $\chi^2 < 30$
- **Use $p \times \pi$ charge to define “signal” and “non-signal” samples (π^+ from $D^0\text{bar}$ goes with p from Λ)**

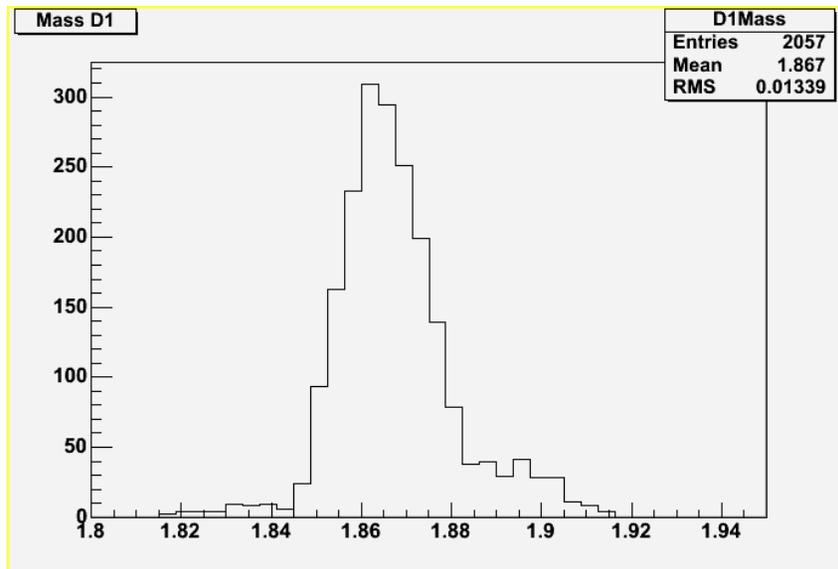
Raw PQ Candidate Mass Spectrum



PQ Candidate Mass, GeV

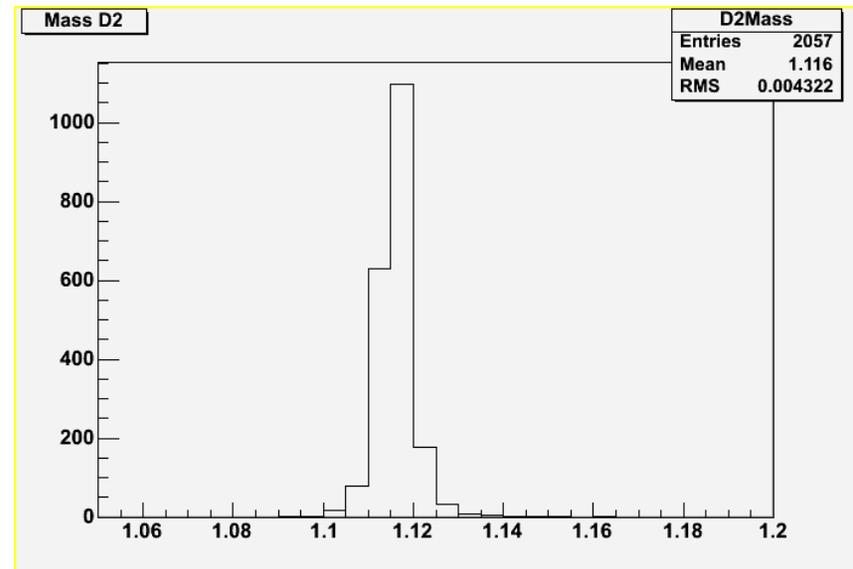
"Right" Charge Correlation & 1 Candidate per event Only

D^0 Candidates



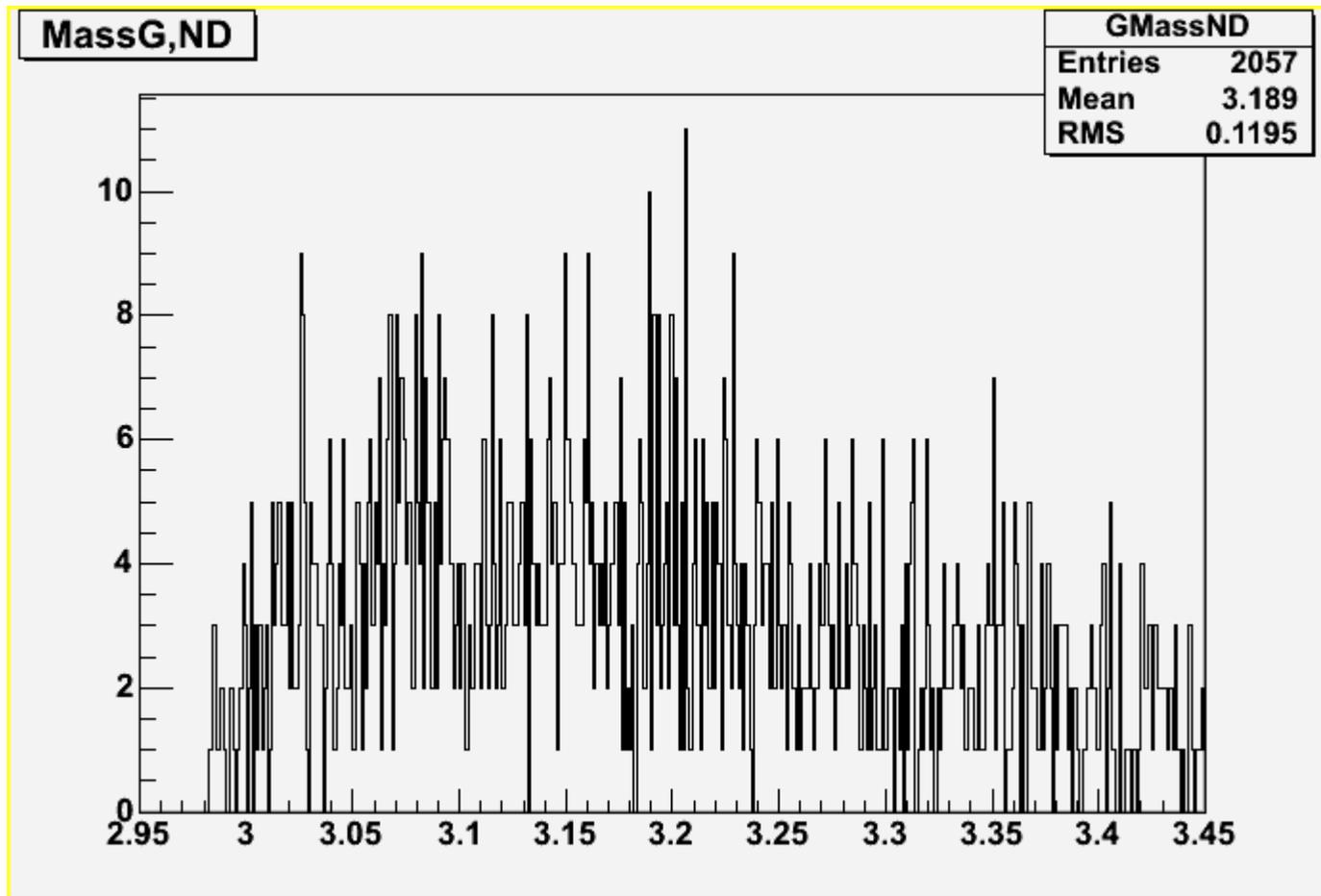
Mass, GeV

Λ Candidates



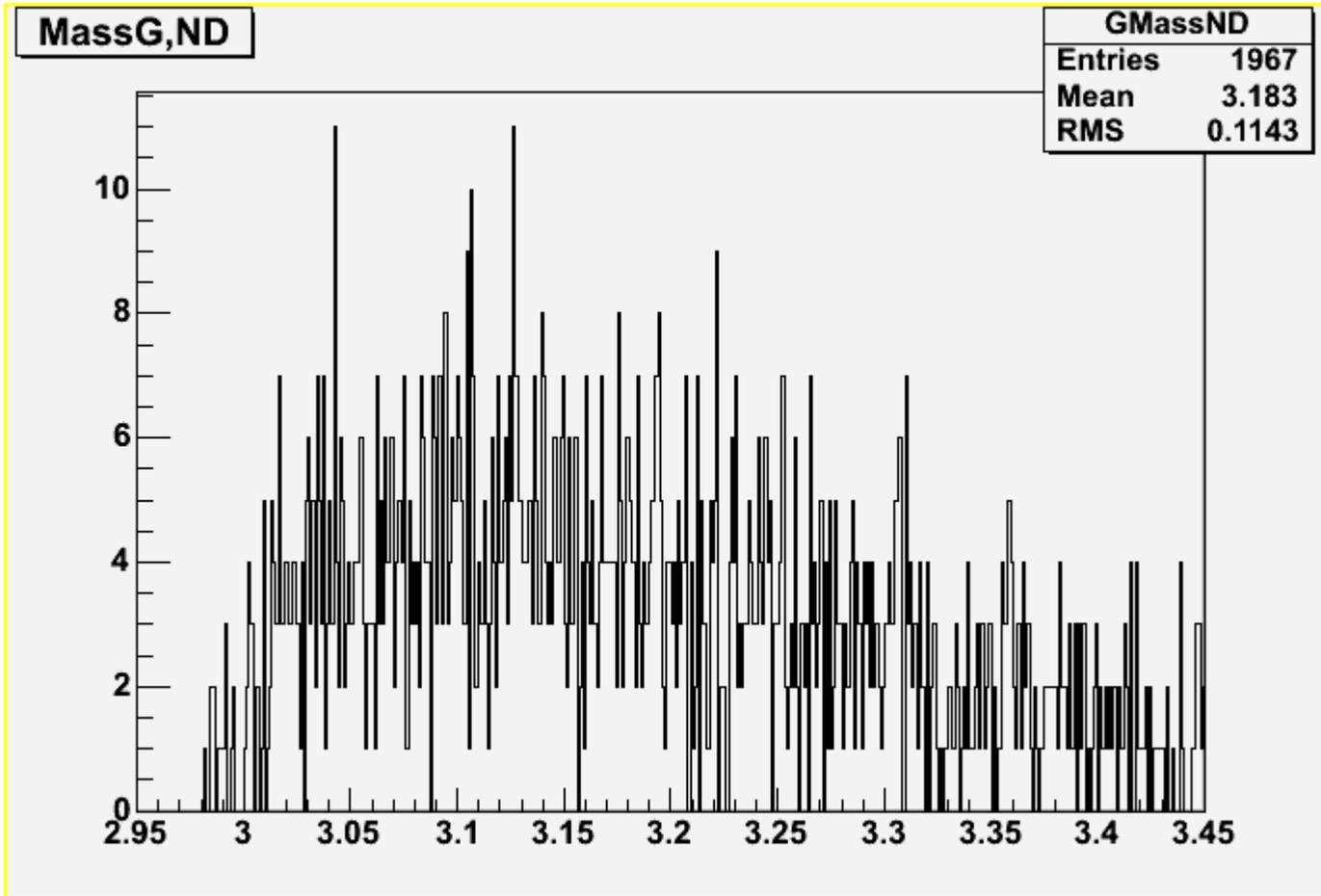
Mass, GeV

"Right" Charge Correlation & 1 Candidate per event Only



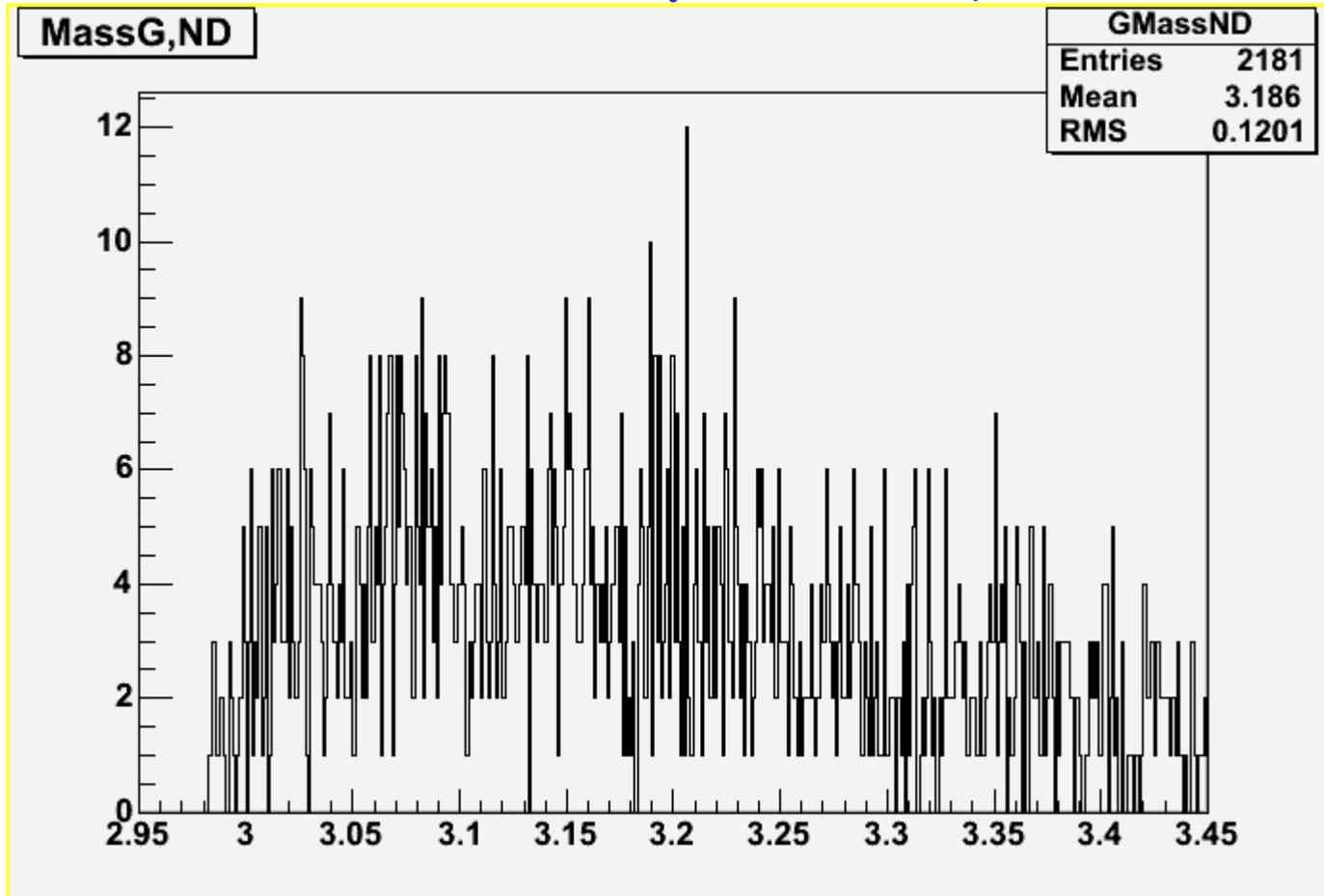
PQ Candidate Mass, GeV

"Wrong" Charge Correlation & 1 Candidate per event Only



PQ Candidate Mass, GeV

What if we drop the $P_{+}[PQ]$ cut



No impact - i.e. the pre-selection and D^0, Λ selection control the minimum pt of the 2 body system

Next Steps

- Do it “more rigorously” (unless, as Christoph says, you are only interested in making pretty plots!)
 - Remove Λ 's which also lie in the K^0 mass window
 - Cut even more tightly on D^0 and Λ
 - Analyze a reference channel
 - A convenient one is $\Lambda_B \rightarrow J/\psi \Lambda$
 - Now started on this but I am encountering “technical problems”
 - Check out on Monte Carlo
 - Check (again) for mistakes in my coding