Status of the D*lν Mixing Analysis

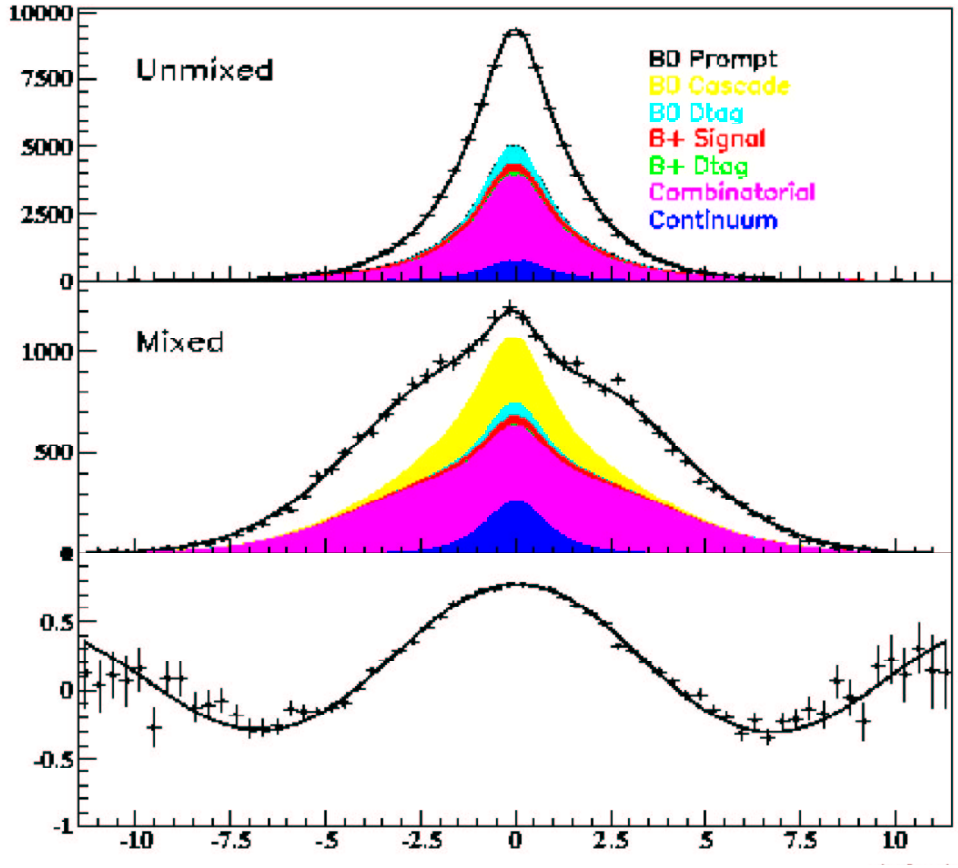
News since last presentation:

- Boost Approximation and Selection Biases
- Combinatorial Description Checks
- Some Systematics Evaluation
- Next Steps

Martino, 10 Dec. ’03

Preliminary **BLIND** Data Results (2000−2002 Statistics)

Lepton Tagged Sample



τ =1.573+−0.009 ps

Δm=0.446+−0.004 ps^{-1}

Nevents:

MB(m_{ν}^2>−4.5 GeV^2): 117661

SB(Continuum/Combinatorial param.) (−10<m_{ν}^2<−4.5 GeV^2): 43962

Analysis Bias 1

MC: generated τ=1.548 ps; Δm=0.472 ps^{-1} ; χ_d=0.173

B^0B^0 All tags, Prob(VTX(πl))>0.1% : Nevt = 1511K

	True Δt+true tag	True Δz+True tag
τ	1.541+–0.001	1.549+–0.001
Δm	0.4668+−0.0004	0.4635+−0.0004
χ(Fit)	0.1706+–0.0003	0.1700+–0.0003
χ(Exp)=Nmixed/Ntotal	0.1713+–0.0003	

	τ	Δm
Selection Bias:	−0.007	−0.005
Boost Approx. Bias:	+0.008	−0.003

- Selection Bias induced by the VTX fit requirement?

Analysis Bias 2

Pure Signal, Prompt Leptons: Nevt=127K

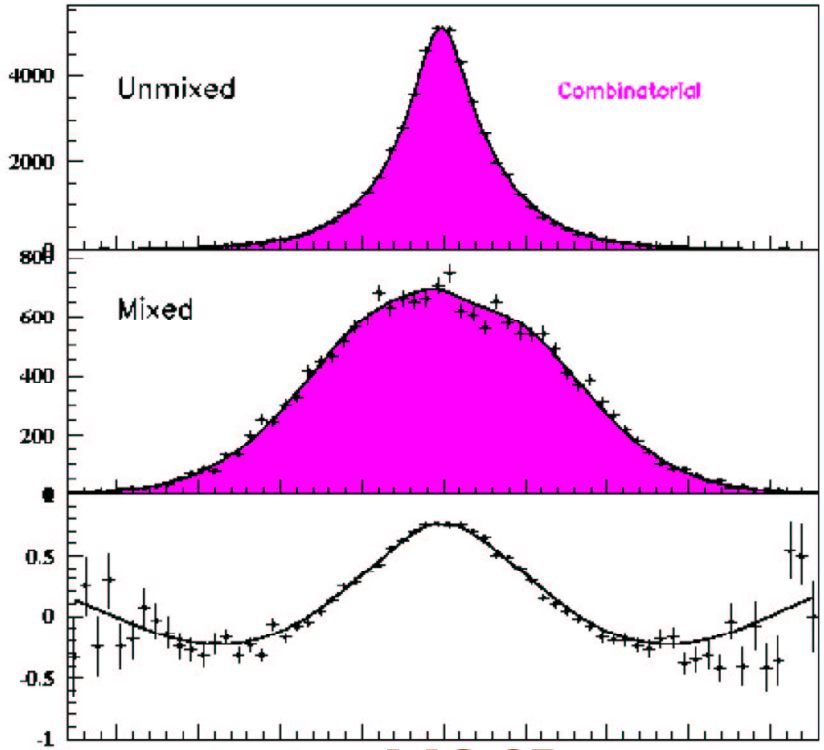
	True Δt+True tag	True Δz+True tag
τ	1.541+–0.004	1.547+–0.004
Δm	0.467+−0.001	0.464+−0.001
χ(Fit)	0.171+–0.001	0.170+–0.001
χ(Exp)	0.172+−0.001	

	Exp Δz+True tag	True Δz+Exp tag	Exp Δz+Exp tag
τ	1.538+–0.005	1.547+–0.004	1.542+–0.005
Δm	0.467+−0.002	0.463+−0.001	0.465+−0.002
χ(Fit)	0.170+–0.001	0.169+–0.001	0.170+–0.001

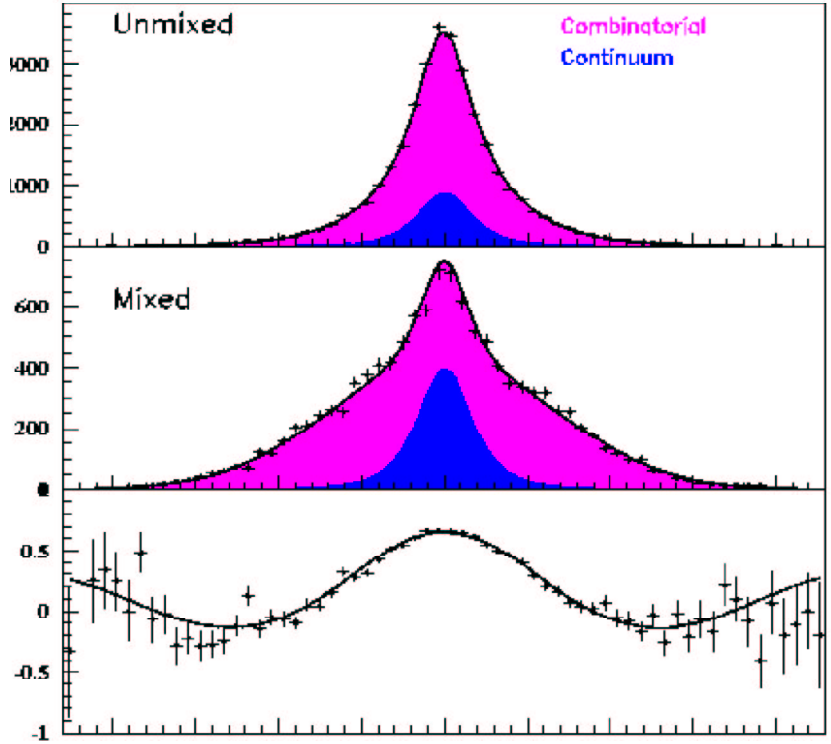
- Boost Approximation Bias absorbed by dilution + resolution parameters in the experimental Δz+tag fit
- Toy MC needed to understand the observed residual bias (Selection/Fit?)

Combinatorial Description Checks

- Combinatorial PDF determined by a simultaneous fit to MB+SB right charge Correlation Samples:



MC SB



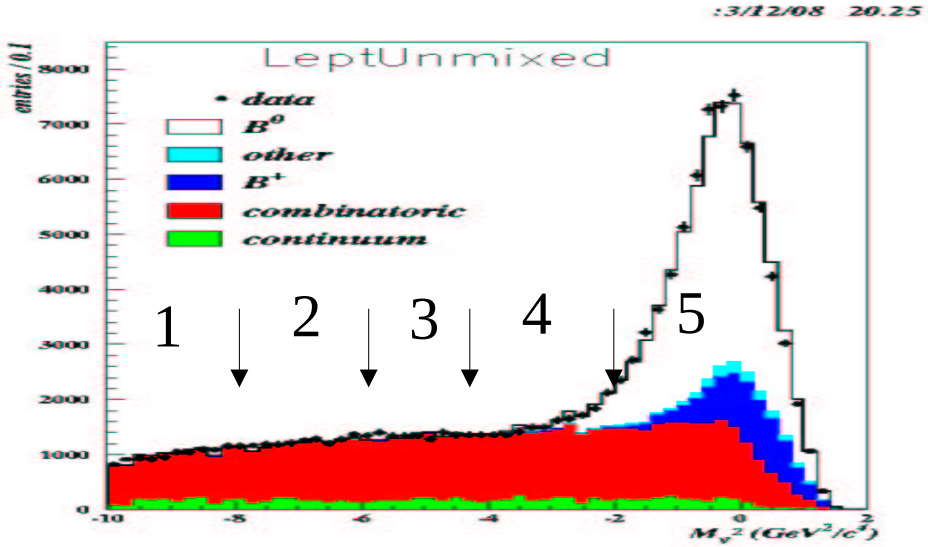
DATA SB

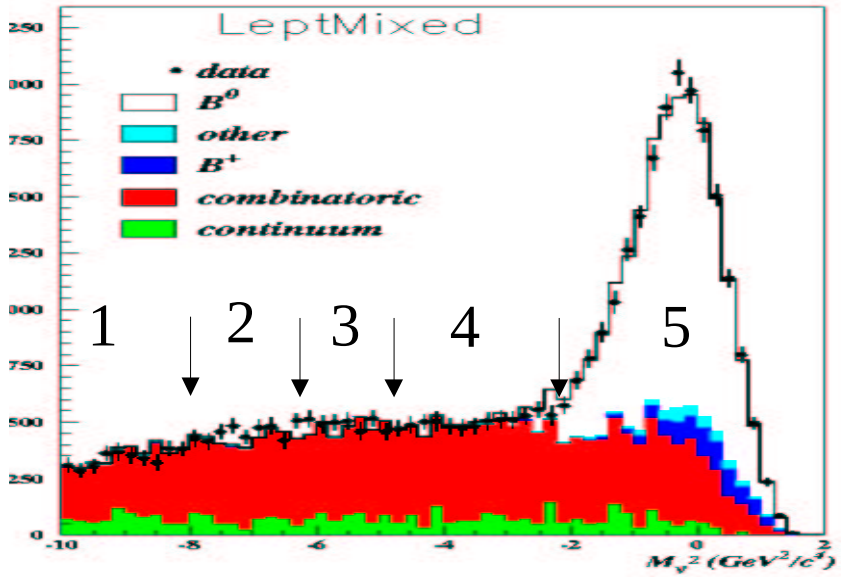
Procedure checked by:

- Kolmogorov Test of the MC Combinatorial Δz distribution in different $m\nu^2$ bins
- Stabilty of the MC/DATA results using different $m\nu^2$ ranges for the SB definition

Kolmogorov Test

- MC Combinatorial Δz distribution diveded in 5 mv^2 bins:





Unmixed Sample

Prob(%)	2	3	4	5
1	41	8	56	39
2		86	87	98
3			69	26
4				89

Mixed Sample

2	3	4	5
96	46	19	23
	51	35	42
		79	46
			23

Stability vs Side Band Definition

	MC Fit	DATA Fit
Default SB: $-10<m\nu^2<-4.5$		
●SB: $-8.5<m\nu^2<-4.5$		
$\delta\tau$	−0.002	+0.004
$\delta\Delta m$	−0.001	+0.001
●SB:$-7<m\nu^2<-4.5$		
$\delta\tau$	+0.005	Conv. Probl
$\delta\Delta m$	0	

●Some Systematics Evaluation:

	δ(Comb. Fraction)=2%	$\delta(\tau B^+)$=+−2%	δ(Cascade dilution)=+−25%
$\delta\tau$	0.007	0.004	0.003
$\delta\Delta m$	0.004	0.005	0.003

Work in Progress:

- Fit Validation:
  Toy MC
  Scan over the (τ, Δm) plane to check the Likelihood behaviour around the minimum (fit seems to be slightly affected by the parameter starting point: iterative procedure to reach the stability)

- Residual Systematics determination:
  Alignment (different data samples)
  σ(cc) on−peak/off−peak

- BAD 287 (Rewrite from scratch...)