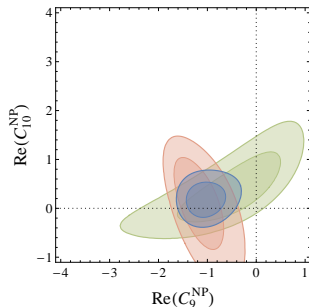


Fully inclusive $b \rightarrow X_S //$



Motivation, current strategy and aims

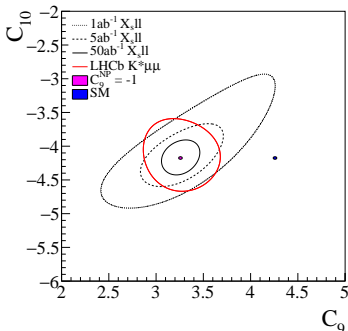
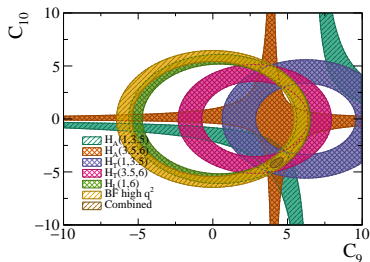
- Motivation:
 - ▶ No fully inclusive measurement of $b \rightarrow sll$ decays.
 - ▶ A variety of discrepancies with SM seen in exclusive $b \rightarrow sll$ decays.
 - ▶ BF of $B^{+0} \rightarrow XJ/\psi$ not measured only the admixture (20 fb^{-1} BaBar)
- Current strategy and aims:
 - ▶ sll with tagging requires large stats \implies measure control mode $B^{+0} \rightarrow XJ/\psi$
 - ▶ Measure charged and neutral BFs first time (tagged)
 - ▶ First measurement of M_{X_s} for $B^{+0} \rightarrow XJ/\psi$.



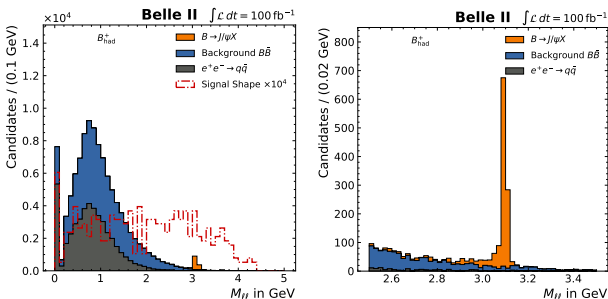
Helicity remind for $s\ell\ell$

- 3 helicity amplitudes $H_A(q^2)$, $H_L(q^2)$, $H_T(q^2)$,
- Measuring these separately better constraints the wilson C_9 and C_{10}
- In XJ/ψ we can also reconstruct the helicity angle in a similar way.

$$\frac{d^2\Gamma}{dq^2 \cos\theta} = \frac{3}{8} \left[(1 + \cos^2\theta)H_T(q^2) + 2\cos\theta H_A(q^2) + 2(1 - \cos^2\theta)H_L(q^2) \right]$$

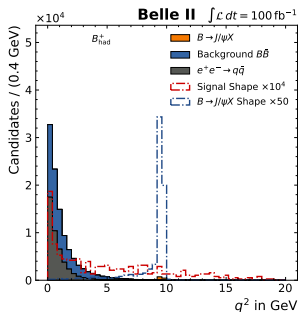


- Look at hadronic B^+ FEI skim here (we are also looking at SL FEI and B^0).
- Prominent J/ψ peak from signal in the $M_{\ell\ell}$ distribution (100fb^{-1}).
- Only selection basic PID and p cuts for $\ell\ell$, $M_{bc}^{\text{tag}} > 5.27$, $\mathcal{P} > 0.01$
- expect: only 11 $s\ell\ell$ events, 1462 $J/\psi X$, 60644 Other $B\bar{B}$ background, 44625 Continuum



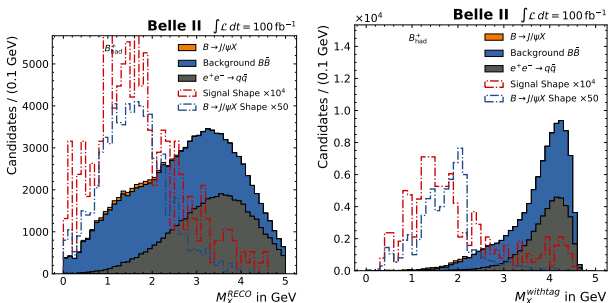
q^2

- q^2 simply comes from M_ℓ .
- We have also checked the resolution using truth and it is good.
- We still however must correct for Bremsstrahlung for e_s

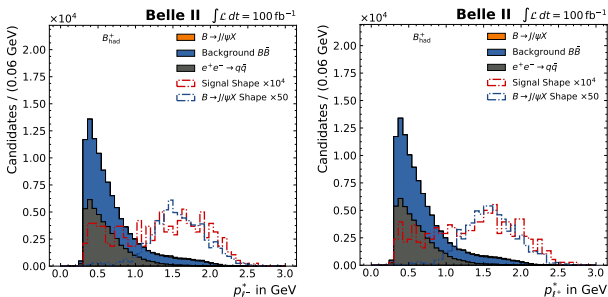


M_X

- Two methods explicit RECO or M_X using 4-momentum conservation.
- The later has great separation between signal and background (even for SL tagging)
- The reason is the background has usually 2 extra neutrinos e.g $B \rightarrow (D \rightarrow X \ell \nu) \ell \nu$
- Great control channel to understand X reco better in data! Can also examine backgrounds in $e\mu$ channels.



- Nice discrimination in p_ℓ^*
- After a selection of the form $p_\ell^* < 1$, $\Delta E_{sig} > -0.2$, $M_{bc}^{sig} > 5$, $M_X < 3$ one can retain $\sim 35\%$ of ll decays while removing 98% of $B\bar{B}$ and 99.5 % of continuum backgrounds.



Conclusion

- Next steps process all remaining samples.
- Fit $M_{J/\psi}$, potentially also in M_X bins
- Data MC comparisons.