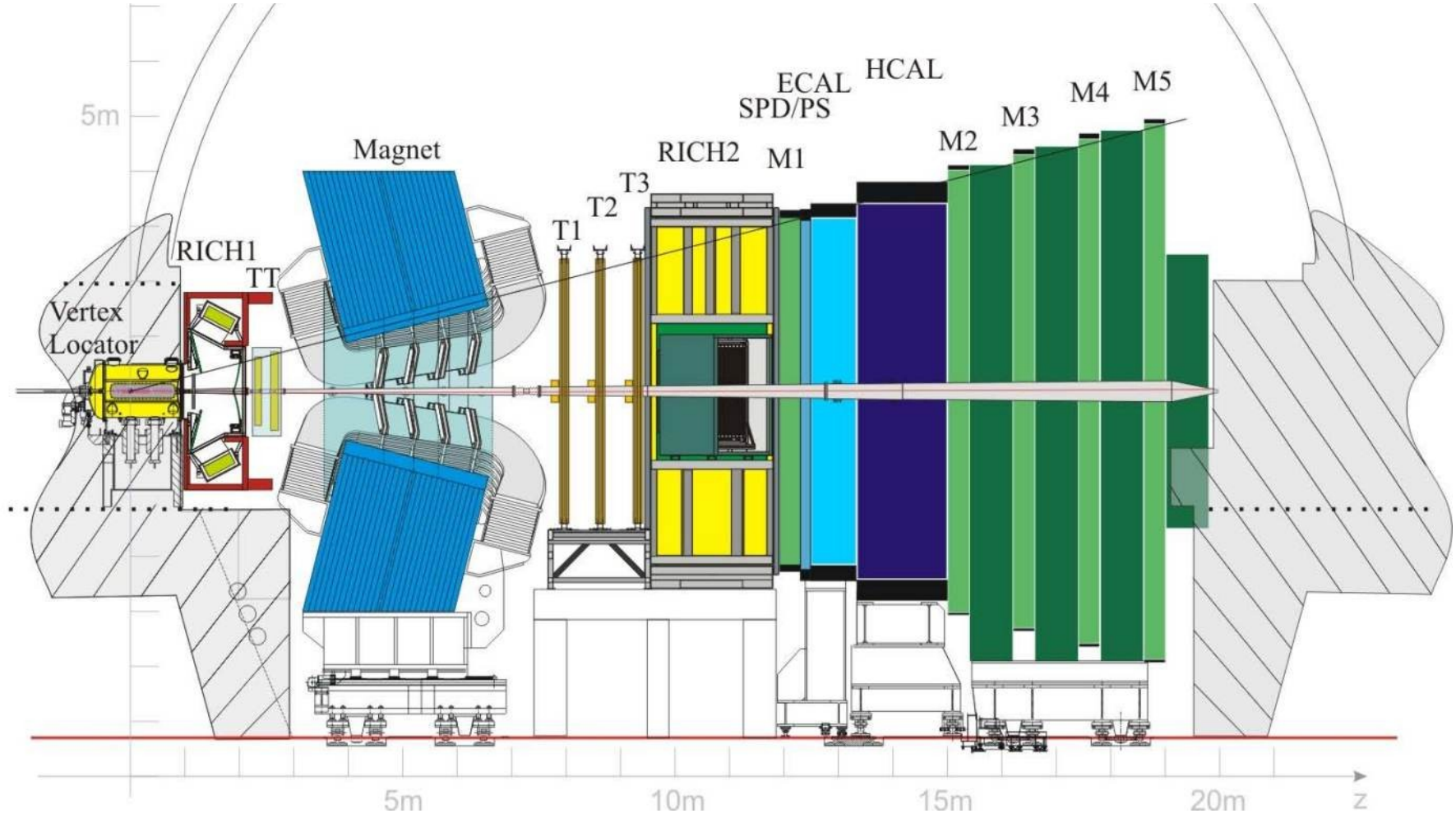

5m
Magnet
RICH2
M1
ECAL
HCAL
SPD/PS
M2
M3
M4
M5
T3
T2
T1
RICH1
TT
Vertex
Locator
5m
10m
15m
20m
z

Run 2:

$$\Delta A_{CP}^{\pi-\text{tagged}} = [-18.2 \pm 3.2\ (\text{stat.}) \pm 0.9\ (\text{syst.})] \times 10^{-4}$$

$$\Delta A_{CP}^{\mu-\text{tagged}} = [\ -9 \pm\ 8\ (\text{stat.}) \pm\ 5\ (\text{syst.})] \times 10^{-4}$$

Run 1+2:

$$\Delta A_{CP} = (-15.4 \pm 2.9) \times 10^{-4}$$

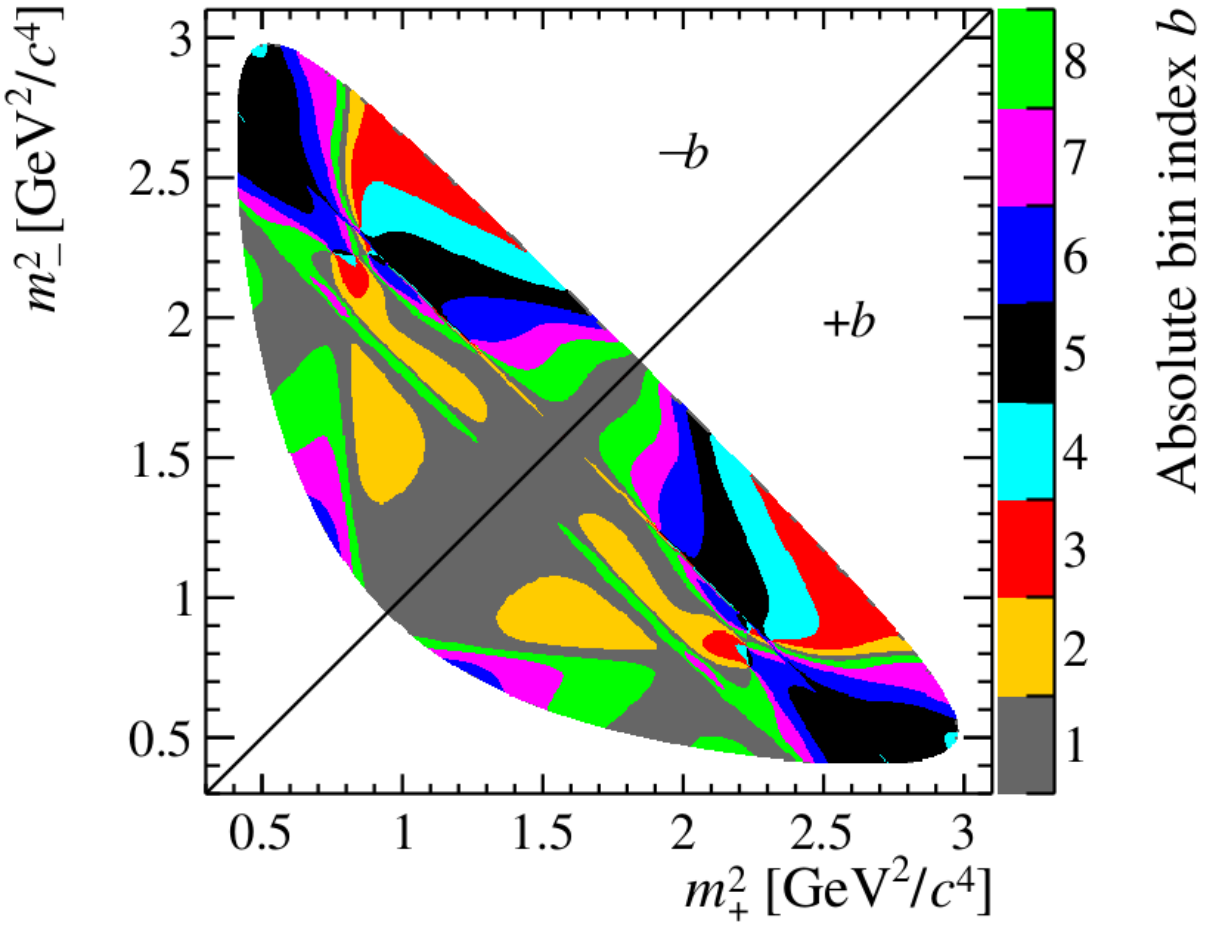
Run 2 (partially):

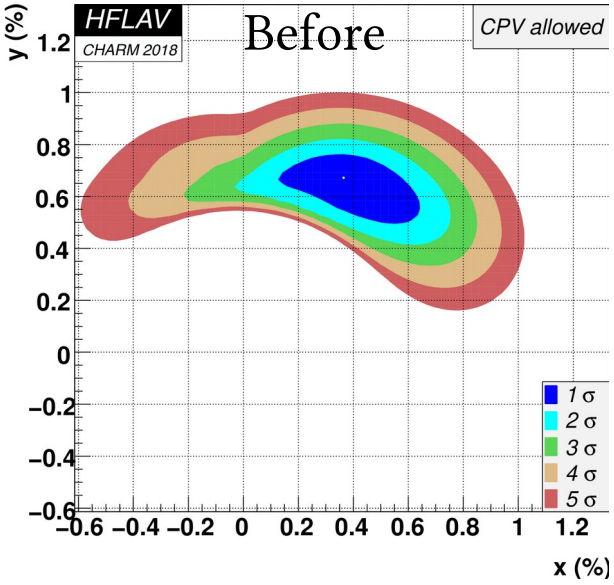
$$\Delta A_{\Gamma}^{\pi-\text{tagged}} = [+3.4 \pm 3.1\ (\text{stat.}) \pm 0.6\ (\text{syst.})] \times 10^{-4}$$

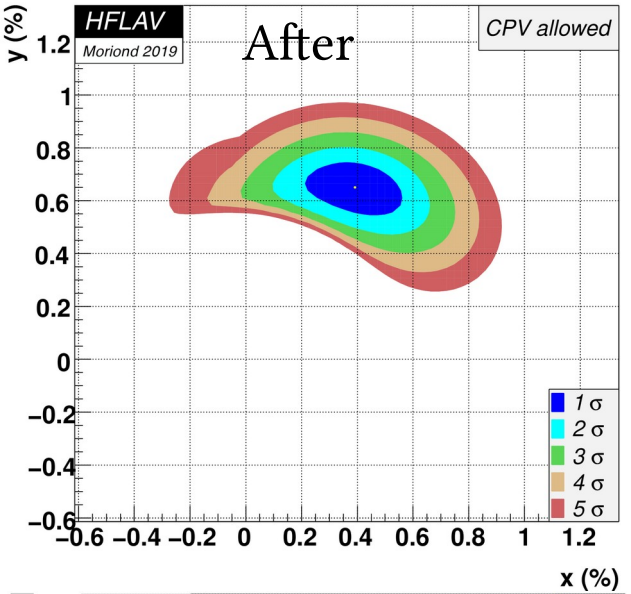
$$\Delta A_{\Gamma}^{\mu-\text{tagged}} = [-2.9 \pm 3.2\ (\text{stat.}) \pm 0.5\ (\text{syst.})] \times 10^{-4}$$

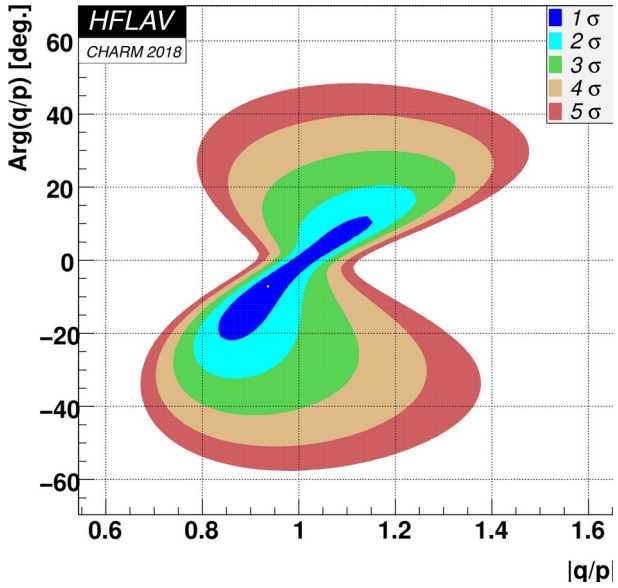
Run 1+2:

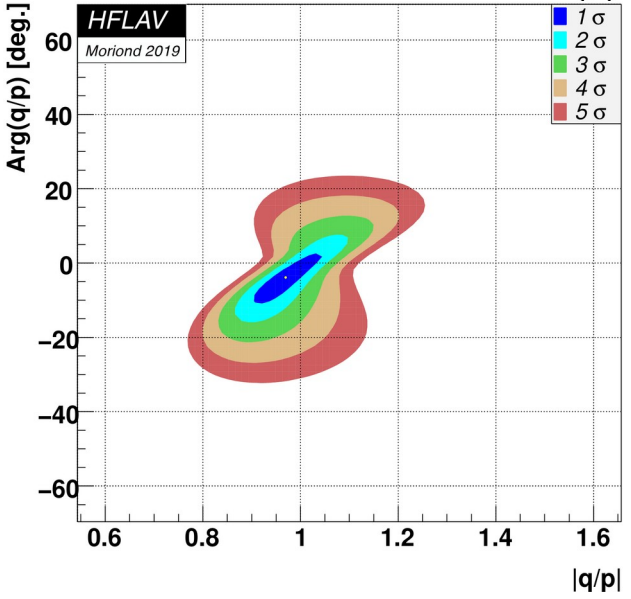
$$A_{\Gamma} = (-1.1 \pm 1.7 \pm 0.5) \times 10^{-4}$$


m^2_- [GeV$^2/c^4$]
m^2_+ [GeV$^2/c^4$]
Absolute bin index b
$-b$
$+b$
0.5
1
1.5
2
2.5
3
1
2
3
4
5
6
7
8


HFLAV
CHARM 2018
Before
CPV allowed
y (%)
x (%)
1 σ
2 σ
3 σ
4 σ
5 σ


HFLAV
Moriond 2019
After
CPV allowed
y (%)
x (%)
1 σ
2 σ
3 σ
4 σ
5 σ


HFLAV
CHARM 2018
Arg(q/p) [deg.]
|q/p|
1 σ
2 σ
3 σ
4 σ
5 σ


HFLAV
Moriond 2019
Arg(q/p) [deg.]
|q/p|
1 σ
2 σ
3 σ
4 σ
5 σ

Parameter	Value	95.5% CL interval
$x\ [10^{-2}]$	$0.27\,^{+0.17}_{-0.15}$	$[-0.05, 0.60]$
$y\ [10^{-2}]$	0.74 ± 0.37	$[\ \ 0.00, 1.50]$
$\lvert q/p \rvert$	$1.05\,^{+0.22}_{-0.17}$	$[\ \ 0.55, 2.15]$
ϕ	$-0.09\,^{+0.11}_{-0.16}$	$[-0.73, 0.29]$

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Binflip method

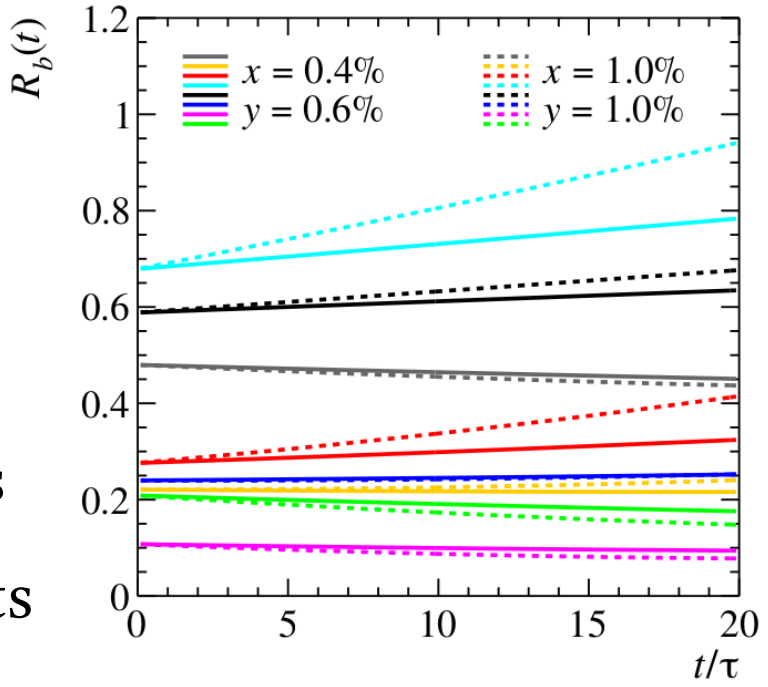
$$R_{bj} = \frac{N_{-bj}}{N_{bj}}$$

$$R_{bj}^{\pm} \approx \frac{r_b + \frac{1}{4} r_b \langle t^2 \rangle_j \, \mathrm{Re}(z_{CP}^2 - \Delta z^2) + \frac{1}{4} \langle t^2 \rangle_j \, |z_{CP} \pm \Delta z|^2 + \sqrt{r_b} \langle t \rangle_j \, \mathrm{Re}[X_b^*(z_{CP} \pm \Delta z)]}{1 + \frac{1}{4} \langle t^2 \rangle_j \, \mathrm{Re}(z_{CP}^2 - \Delta z^2) + r_b \frac{1}{4} \langle t^2 \rangle_j \, |z_{CP} \pm \Delta z|^2 + \sqrt{r_b} \langle t \rangle_j \, \mathrm{Re}[X_b(z_{CP} \pm \Delta z)]}.$$

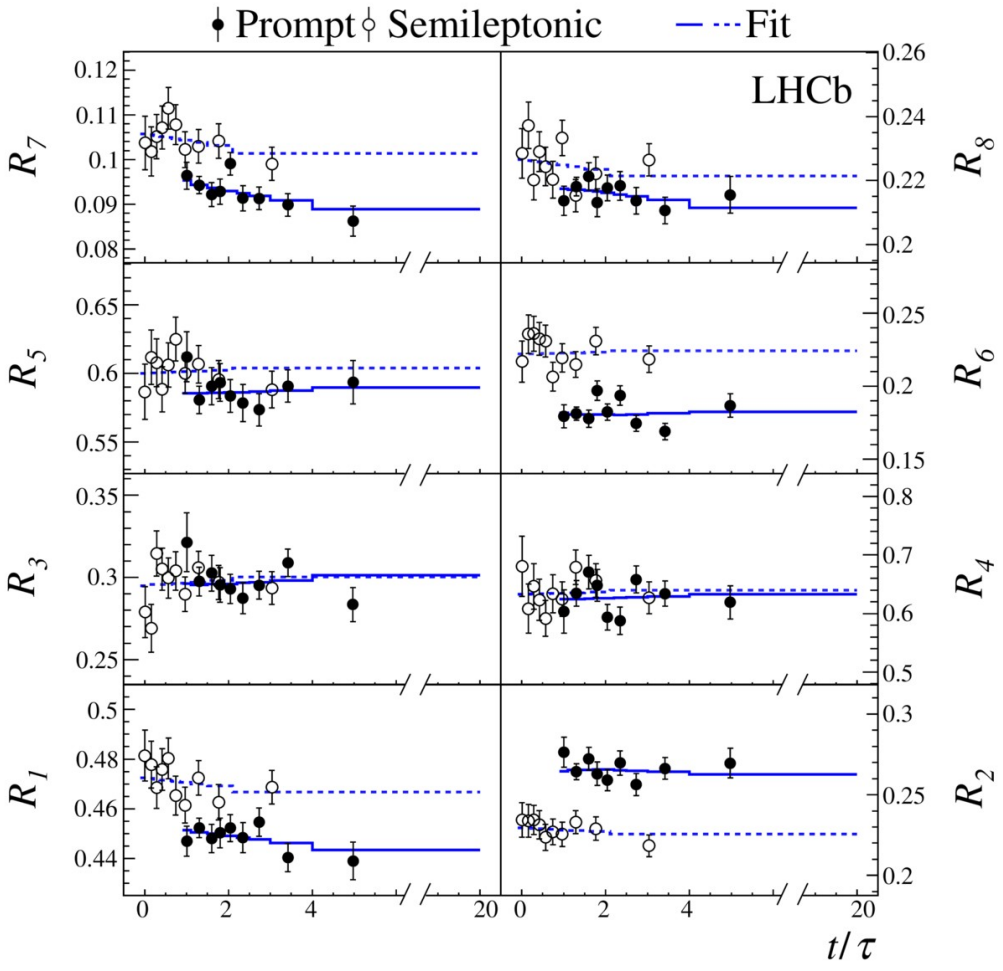
$$X_b \equiv c_b - i s_b$$

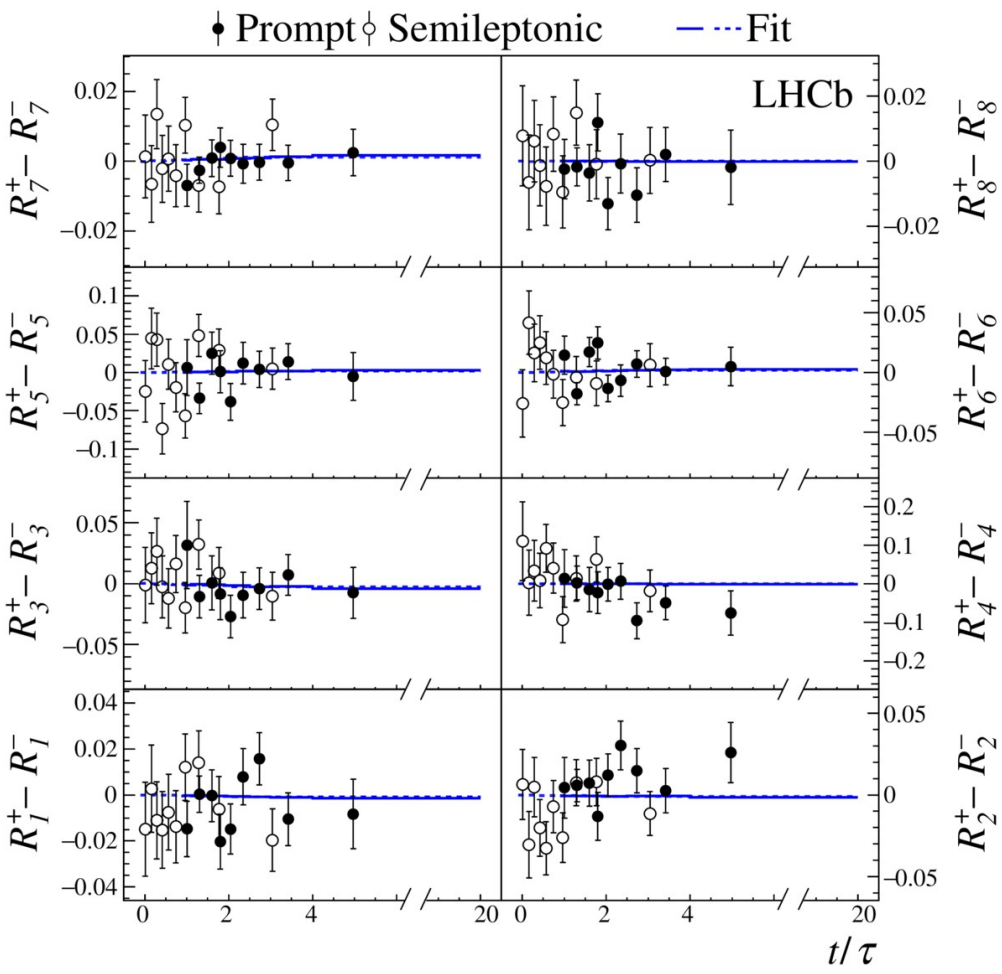
- r_b nuisance parameter
- X_b external input from CLEO

- Avoids modeling of D decay dynamics
- Cancellation of most acceptance effects

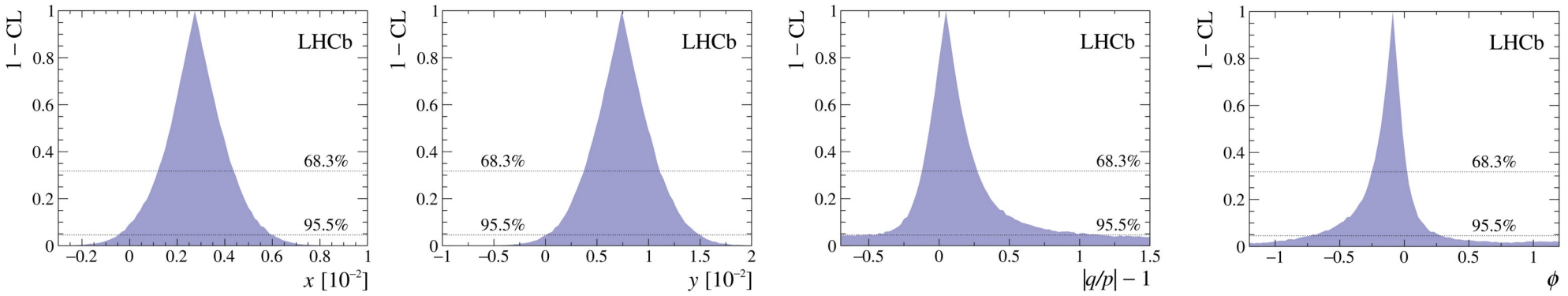


Mixing and CPV fit





Fit results



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- Most precise measurement of x by a single experiment
  - Important to improve precision on x

Signal yield	$\sigma(x_{CP})$ [%]	$\sigma(y_{CP})$ [%]	$\sigma(\Delta x)$ [%]	$\sigma(\Delta y)$ [%]
1×10^6	0.22 (0.21)	0.43 (0.41)	0.16 (0.15)	0.31 (0.29)
5×10^6	0.10 (0.093)	0.24 (0.19)	0.068 (0.065)	0.16 (0.13)
1×10^7	0.085 (0.066)	0.16 (0.13)	0.048 (0.046)	0.095 (0.091)
5×10^7	0.047 (0.030)	0.120 (0.059)	0.021 (0.021)	0.041 (0.041)
1×10^8	0.043 (0.021)	0.091 (0.042)	0.015 (0.015)	0.028 (0.028)
5×10^8	0.034 (0.009)	0.091 (0.018)	0.006 (0.006)	0.013 (0.013)