

TIME-REVERSAL ASYMMETRIES IN

$$\Lambda_b \rightarrow \Lambda(\rightarrow p\pi^-)\ell^+\ell^-$$

Based on ArXiv:2212.02976

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OUTLINE

- Background
- Helicity amplitudes
- T-odd observables
- Angular distributions
- Numerical results
- Conclusion

BACKGROUND

Direct evidence on TV

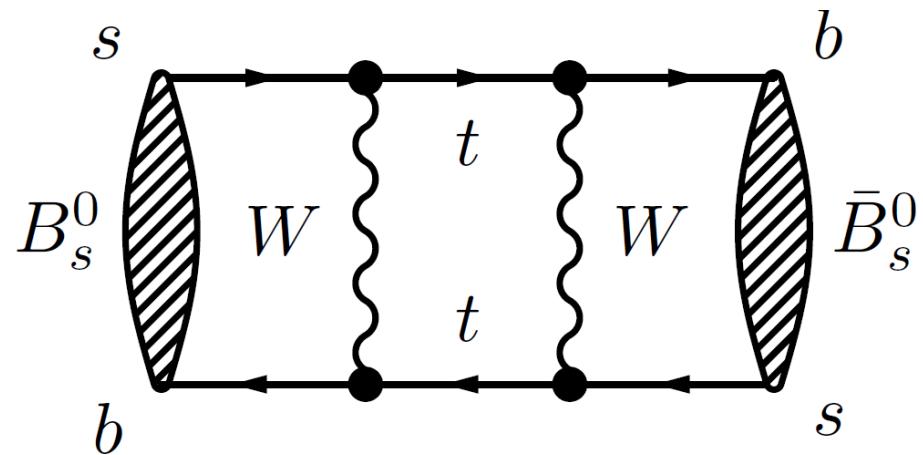
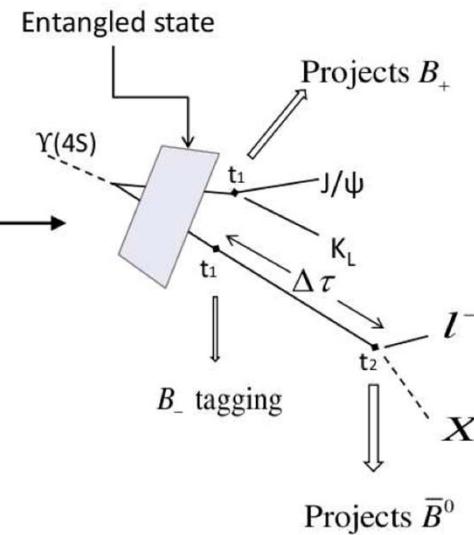
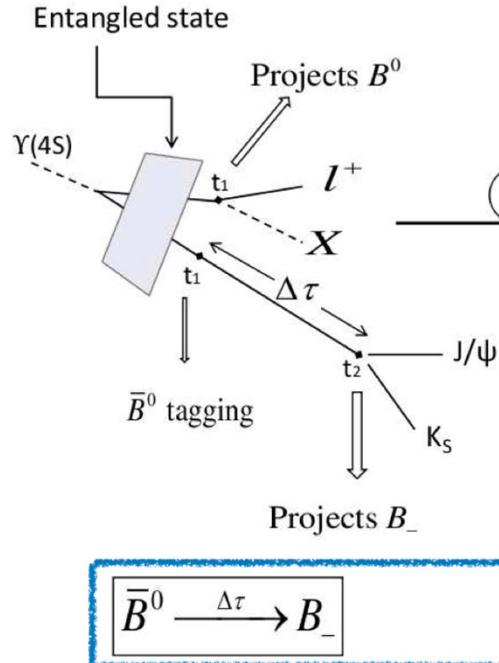


Figure from LHCb

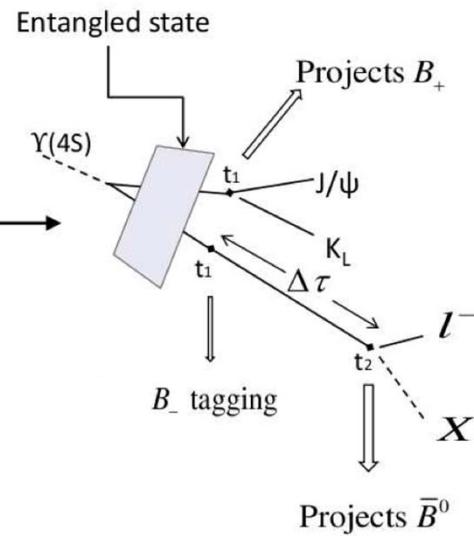
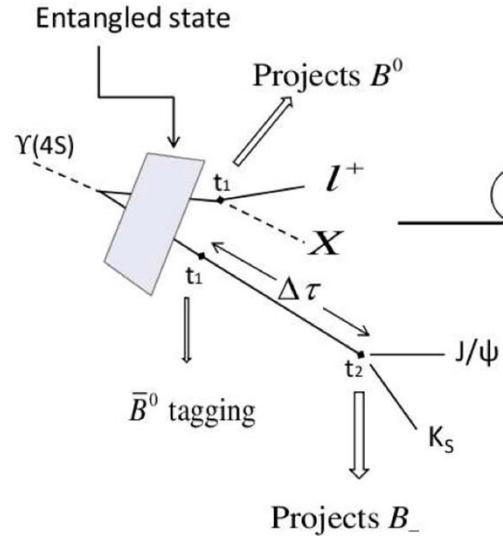
$$|i\rangle = \frac{1}{\sqrt{2}} (B^0 \bar{B}^0 - \bar{B}^0 B^0)$$

$$|i\rangle = \frac{1}{\sqrt{2}} (B_+^0 B_-^0 - B_-^0 B_+^0)$$

- J. Bernabeu *et al.* **JHEP 08, 064 (2012).**
- J. P. Lees *et al.* [BaBar] **PRL 109, 211801(2012).**

BACKGROUND

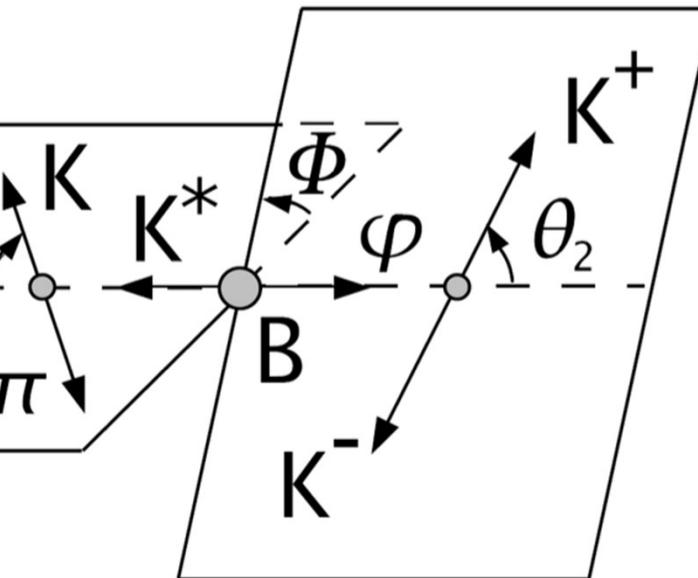
Direct evidence on TV



$$\bar{B}^0 \xrightarrow{\Delta\tau} B_-$$

$$B_- \xrightarrow{\Delta\tau} \bar{B}^0$$

Indirect evidence on TV



$$\vec{p}_1 \times \vec{p}_2 \cdot \vec{p}_3 \xrightarrow{T} -\vec{p}_1 \times \vec{p}_2 \cdot \vec{p}_3$$

$$\epsilon^{\mu\nu\sigma\omega} p_\mu^1 p_\nu^2 p_\sigma^3 p_\gamma^4 \xrightarrow{T} -\epsilon^{\mu\nu\sigma\omega} p_\mu^1 p_\nu^2 p_\sigma^3 p_\gamma^4$$

G. Kramer and W. F. Palmer, PRD **45**, 193 (1992); C.W. Chiang and L. Wolfenstein, PRD **61**, 074031 (2000).

B.Aubert et al. [BaBar], PRL **93**, 231804 (2004).

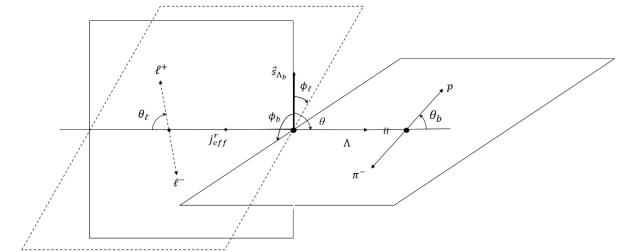
- J. Bernabeu et al. JHEP **08**, 064 (2012).
- J. P. Lees et al. [BaBar] PRL **109**, 211801(2012).

BACKGROUND

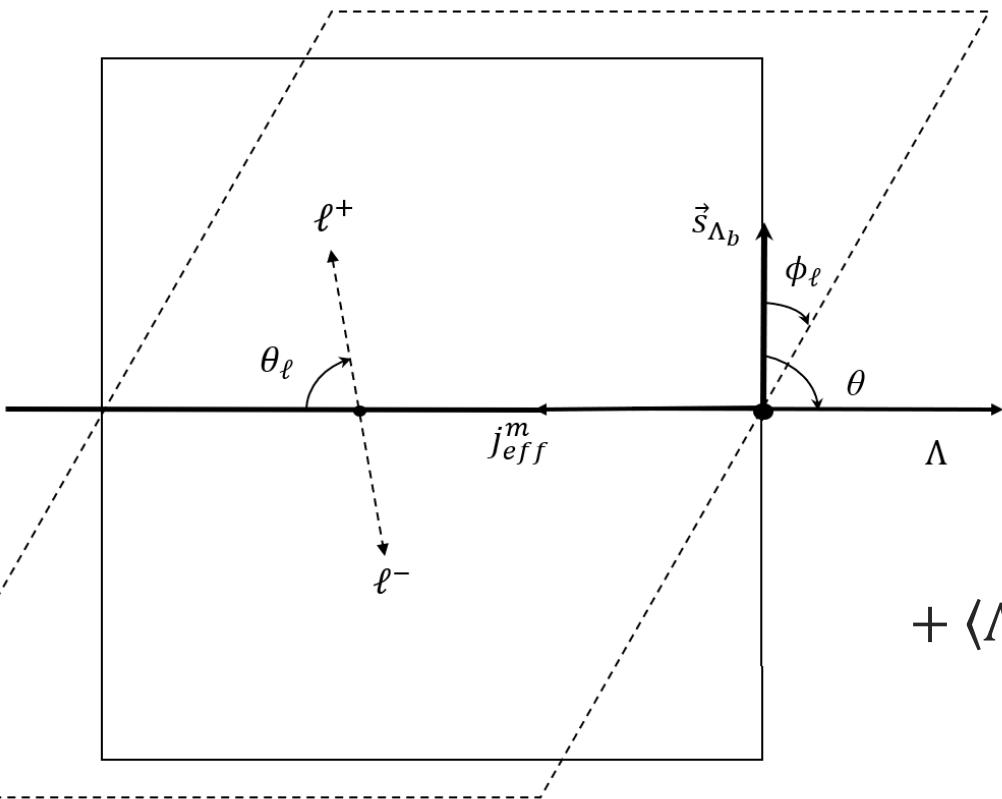
The full form of angular distribution of $\Lambda_b \rightarrow \Lambda\mu^+\mu^-$ is given by

$$\begin{aligned}
 \mathcal{D}(q^2, \vec{\Omega}) = & \frac{3}{32\pi^2} \left((K_1 \sin^2 \theta_l + K_2 \cos^2 \theta_l + K_3 \cos \theta_l) + (K_4 \sin^2 \theta_l + K_5 \cos^2 \theta_l + K_6 \cos \theta_l) \cos \theta_b + \right. \\
 & (K_7 \sin \theta_l \cos \theta_l + K_8 \sin \theta_l) \sin \theta_b \cos(\phi_b + \phi_l) + (K_9 \sin \theta_l \cos \theta_l + K_{10} \sin \theta_l) \sin \theta_b \sin(\phi_b + \phi_l) + \\
 & (K_{11} \sin^2 \theta_l + K_{12} \cos^2 \theta_l + K_{13} \cos \theta_l) \cos \theta + (K_{14} \sin^2 \theta_l + K_{15} \cos^2 \theta_l + K_{16} \cos \theta_l) \cos \theta_b \cos \theta + \\
 & (K_{17} \sin \theta_l \cos \theta_l + K_{18} \sin \theta_l) \sin \theta_b \cos(\phi_b + \phi_l) \cos \theta + (K_{19} \sin \theta_l \cos \theta_l + K_{20} \sin \theta_l) \sin \theta_b \sin(\phi_b + \phi_l) \cos \theta \\
 & + (K_{21} \cos \theta_l \sin \theta_l + K_{22} \sin \theta_l) \sin \phi_l \sin \theta + (K_{23} \cos \theta_l \sin \theta_l + K_{24} \sin \theta_l) \cos \phi_l \sin \theta + \\
 & (K_{25} \cos \theta_l \sin \theta_l + K_{26} \sin \theta_l) \sin \phi_l \cos \theta_b \sin \theta + (K_{27} \cos \theta_l \sin \theta_l + K_{28} \sin \theta_l) \cos \phi_l \cos \theta_b \sin \theta + \\
 & (K_{29} \cos^2 \theta_l + K_{30} \sin^2 \theta_l) \sin \theta_b \sin \phi_b \sin \theta + (K_{31} \cos^2 \theta_l + K_{32} \sin^2 \theta_l) \sin \theta_b \cos \phi_b \sin \theta + \\
 & \left. (K_{33} \sin^2 \theta_l) \sin \theta_b \cos(2\phi_l + \phi_b) \sin \theta + (K_{34} \sin^2 \theta_l) \sin \theta_b \sin(2\phi_l + \phi_b) \sin \theta \right) ,
 \end{aligned}$$

R.Aaij et al. [LHCb] JHEP 09, 146(2018).



HELICITY AMPLITUDES



$$\frac{G_F}{\sqrt{2}} \frac{\alpha_{em} V_{ts}^* V_{tb}}{2\pi} \left[\langle \Lambda | \bar{s} j_1^\mu b | \Lambda_b \rangle \bar{\ell} \gamma_\mu \ell + \langle \Lambda | \bar{s} j_2^\mu b | \Lambda_b \rangle \bar{\ell} \gamma_\mu \gamma_5 \ell \right]$$

$$j_1^\mu = (C_9^{\text{eff}} + C_9^{\text{NP}}) L^\mu - \frac{2m_b}{q^2} C_{7\gamma}^{\text{eff}} i \sigma^{\mu q} (1 + \gamma_5) + (C_L + C_R) R^\mu$$

$$j_2^\mu = (C_{10} + C_{10}^{\text{NP}}) L^\mu + (C_R - C_L) R^\mu$$

$$\frac{G_F}{\sqrt{2}} \frac{\alpha_{em} V_{ts}^* V_{tb}}{2\pi} \left[\langle \Lambda | \bar{s} j_+^\mu b | \Lambda_b \rangle \bar{\ell} R^\mu \ell + \langle \Lambda | \bar{s} j_-^\mu b | \Lambda_b \rangle \bar{\ell} L^\mu \ell \right]$$

$$j_\pm^\mu = (j_1^\mu \pm j_2^\mu)/2$$

HELICITY AMPLITUDES

$$\frac{G_F}{\sqrt{2}} \frac{\alpha_{em} V_{ts}^* V_{tb}}{2\pi} \sum_{m=1,2} \left(L_t^m B_t^m - \sum_{\lambda=0,\pm} L_\lambda^m B_\lambda^m \right)$$

$$g^{\mu\nu} = \epsilon_t^\mu \epsilon_t^{*\nu} - \sum_{\lambda=0,\pm} \epsilon_\lambda^\mu \epsilon_\lambda^{*\nu}$$

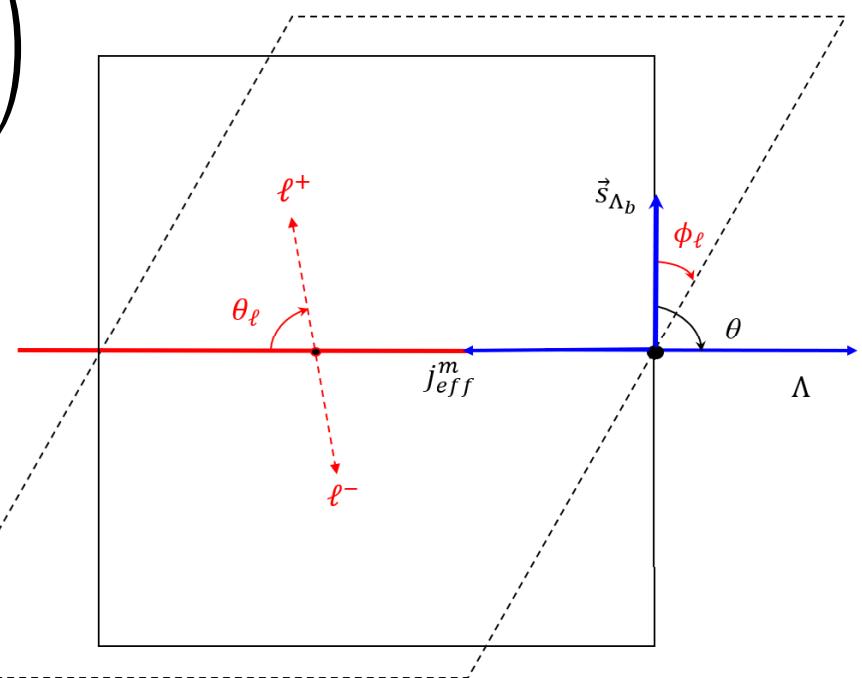
$$\Lambda_b \rightarrow \Lambda j_{eff}^m$$

$$B_{\lambda_m}^m = \epsilon_{\lambda_m}^{*\mu} \langle \Lambda | \bar{s} j_m^\mu b | \Lambda_b \rangle$$

$$j_{eff}^m \rightarrow \ell^+ \ell^-$$

$$L_{\lambda_m}^1 = \epsilon_{\lambda_m}^\mu \bar{u}_\ell \gamma_\mu v$$

$$L_{\lambda_m}^2 = \epsilon_{\lambda_m}^\mu \bar{u}_\ell \gamma_\mu \gamma_5 v$$



HELICITY AMPLITUDES

For $\Lambda_b \rightarrow \Lambda j_{eff}^m$

$$\begin{aligned}|a_{\pm}^m\rangle &= |\pm 1/2, 0\rangle \\|b_{\pm}^m\rangle &= |\mp 1/2, \mp 1\rangle \\|c_{\pm}^m\rangle &= |\pm 1/2, t\rangle\end{aligned}$$

$$\begin{aligned}a_{\pm}^m &= H_{\frac{\pm 1}{2} 0}^m \\b_{\pm}^m &= H_{\frac{\mp 1}{2} \mp 1}^m \\c_{\pm}^m &= H_{\frac{\pm 1}{2} t}^m\end{aligned}$$

Helicity states $|\lambda_{\Lambda}, \lambda_m\rangle$

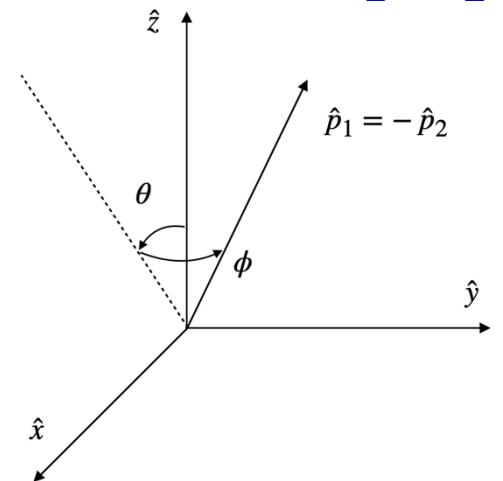
T-ODD OBSERVABLES

$$\Lambda_b \rightarrow \Lambda j_{eff}^m \quad \hat{T} = (\vec{s}_\Lambda \times \vec{s}_m) \cdot \hat{p}_\Lambda$$

$$\hat{T}|\vec{p}, \lambda_1, \lambda_2; J, J_z\rangle$$

$$= \frac{2J+1}{4\pi} \int d\phi d\cos\theta R_z(\phi) R_y(\theta) \hat{T}|p\hat{z}, \lambda_1, \lambda_2\rangle D^{J*}(\phi, \theta, 0)^{J_z}_{\lambda_1 - \lambda_2}$$

$$\hat{T}|p\hat{z}, \lambda_1, \lambda_2\rangle = \frac{i}{2} (s_\Lambda^+ s_m^- - s_\Lambda^- s_m^+) |p\hat{z}, \lambda_1, \lambda_2\rangle$$



T-ODD OBSERVABLES

$$\hat{T}|a_{\pm}^m\rangle = \pm \frac{i}{\sqrt{2}}|b_{\pm}^m\rangle, \hat{T}|b_{\pm}^m\rangle = \mp \frac{i}{\sqrt{2}}|a_{\pm}^m\rangle,$$

$$\left| \lambda_T^m = \pm \frac{1}{\sqrt{2}}, \lambda_{tot} = \frac{1}{2} \right\rangle = \frac{1}{\sqrt{2}}(|a_+^m\rangle \mp i|b_+^m\rangle)$$

$$\left| \lambda_T^m = \pm \frac{1}{\sqrt{2}}, \lambda_{tot} = -\frac{1}{2} \right\rangle = \frac{1}{\sqrt{2}}(|a_-^m\rangle \pm i|b_-^m\rangle)$$

Eigenvalues of
 \hat{T} and $\vec{J} \cdot \vec{p}$,
respectively.

\hat{T} commute with $\vec{J} \cdot \vec{p}$

T-ODD OBSERVABLES

$$I_t |\lambda_T^m, \lambda_{tot}\rangle \rightarrow |-\lambda_T^m, \lambda_{tot}\rangle$$

$$I_s |\lambda_T^m, \lambda_{tot}\rangle \rightarrow |-\lambda_T^m, -\lambda_{tot}\rangle$$

$$\hat{T}$$

T-odd P-odd

$$I_s |\lambda_T^R, \lambda_{tot}\rangle \rightarrow |-\lambda_T^L, -\lambda_{tot}\rangle$$

$$\vec{J} \cdot \vec{p}$$

T-even P-odd

$$I_s |\lambda_T^L, \lambda_{tot}\rangle \rightarrow |-\lambda_T^R, -\lambda_{tot}\rangle$$

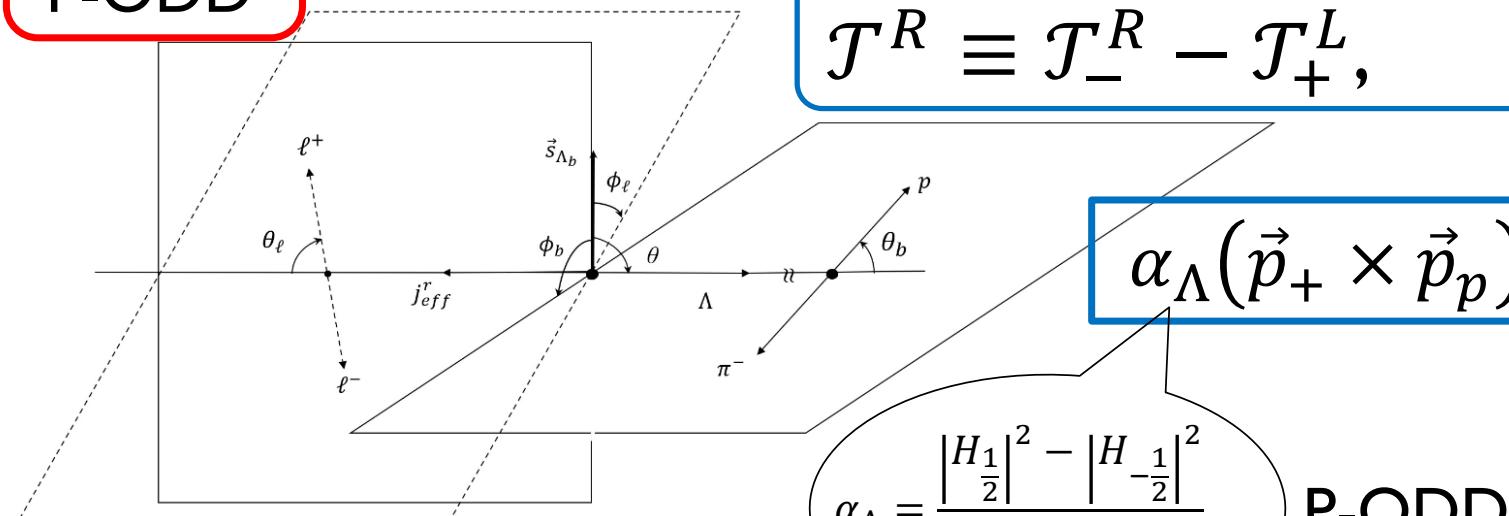
$$\mathcal{T}_{\lambda_{tot}}^r \equiv \left| \left\langle \lambda_T^r = \frac{1}{\sqrt{2}}, \lambda_{tot} \middle| \mathcal{S}_{eff} \middle| \lambda_b \right\rangle \right|^2 - \left| \left\langle \lambda_T^r = -\frac{1}{\sqrt{2}}, \lambda_{tot} \middle| \mathcal{S}_{eff} \middle| \lambda_b \right\rangle \right|^2,$$

T-ODD OBSERVABLES

$$\mathcal{T}_+^r = -2\text{Im}(a_+^r \bar{b}_+^r), \quad \mathcal{T}_-^r = 2\text{Im}(a_-^r \bar{b}_-^r),$$

T-ODD
P-ODD

$$\mathcal{T}^R \equiv \mathcal{T}_-^R - \mathcal{T}_+^L, \quad \mathcal{T}^L \equiv \mathcal{T}_-^L - \mathcal{T}_+^R,$$

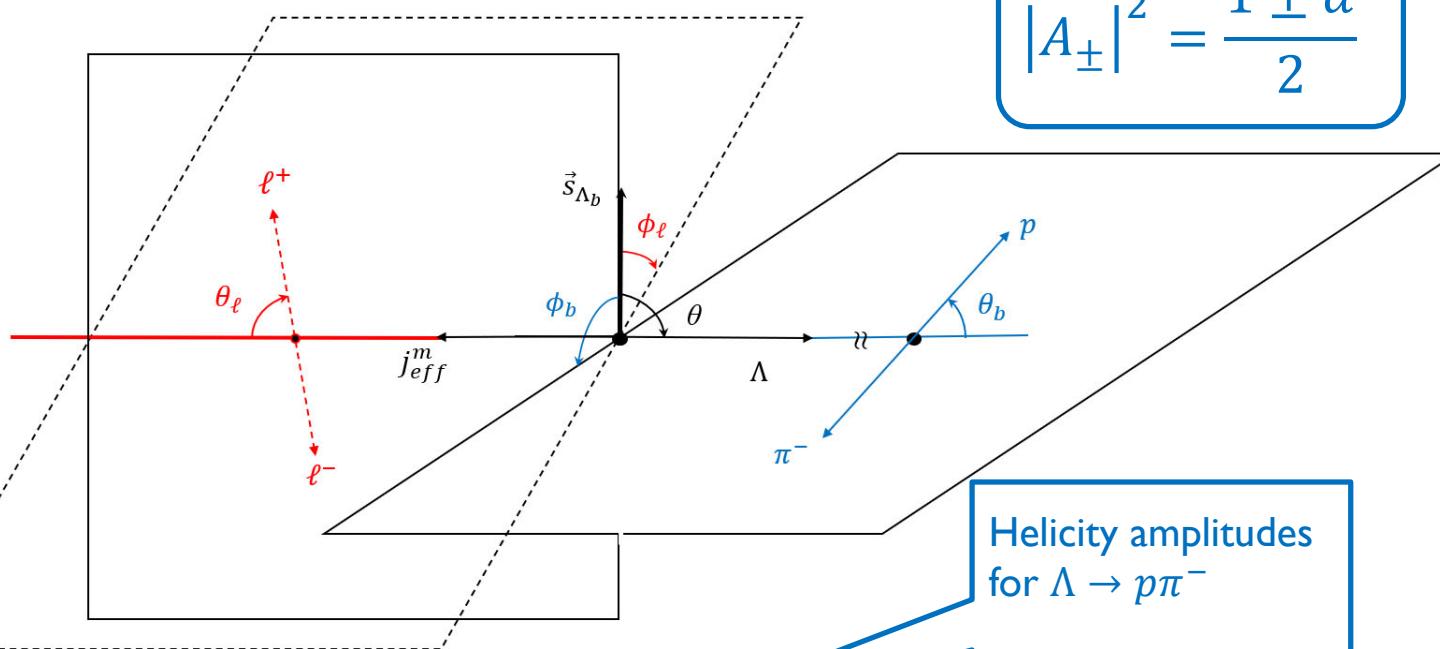


$$\alpha_\Lambda (\vec{p}_+ \times \vec{p}_p) \cdot \vec{p}_\Lambda$$

T-ODD
P-EVEN

$$\alpha_\Lambda = \frac{\left| H_{\frac{1}{2}} \right|^2 - \left| H_{-\frac{1}{2}} \right|^2}{\left| H_{\frac{1}{2}} \right|^2 + \left| H_{-\frac{1}{2}} \right|^2}$$

P-ODD



$$|A_{\pm}|^2 = \frac{1 \pm \alpha}{2}$$

$$\rho_{\pm,\pm} = \frac{1 \pm P_b}{2}$$

$$D(\vec{\Omega}) \propto \sum_{\lambda_p, \lambda_{\pm}, \lambda_b} \rho_{\lambda_b, \lambda_b} |A_{\lambda_p}|^2 \left| \sum_m \sum_{\lambda_m, \lambda_{\Lambda}} (-1)^{J_m} H_{\lambda_{\Lambda} \lambda_m}^m D^{\frac{1}{2}*}(0, \theta)^{\lambda_b}_{\lambda_{\Lambda} - \lambda_m} D^{\frac{1}{2}*}(\phi_b, \theta_b)^{\lambda_{\Lambda}}_{\lambda_p} h_{J_m, \lambda_+ \lambda_-}^m D^{J_m*}(\phi_{\ell}, \theta_{\ell})^{\lambda_m}_{\lambda_+ - \lambda_-} \right|^2$$

Helicity amplitudes for $\Lambda \rightarrow p \pi^-$
Angular distribution for $\Lambda \rightarrow p \pi^-$
Helicity amplitudes of $j_{eff}^m \rightarrow \ell^+ \ell^-$
Helicity amplitudes for $\Lambda_b \rightarrow \Lambda j_{eff}^m$
Angular distribution for $\Lambda_b \rightarrow \Lambda j_{eff}^m$

ANGULAR DISTRIBUTIONS

$$\mathcal{D}(q^2, \vec{\Omega}) = \frac{3}{32\pi^2} \left((K_1 \sin^2 \theta_l + K_2 \cos^2 \theta_l + K_3 \cos \theta_l) + (K_4 \sin^2 \theta_l + K_5 \cos^2 \theta_l + K_6 \cos \theta_l) \cos \theta_b + (K_7 \sin \theta_l \cos \theta_l + K_8 \sin \theta_l) \sin \theta_b \cos(\phi_b + \phi_l) + (K_9 \sin \theta_l \cos \theta_l + K_{10} \sin \theta_l) \sin \theta_b \sin(\phi_b + \phi_l) + \right)$$

R.Aaij et al. [LHCb],
JHEP 09, 146(2018).

$$\begin{aligned} & (K_{11} \sin^2 \theta_l + K_{12} \cos^2 \theta_l + K_{13} \cos \theta_l) \cos \theta + (K_{14} \sin^2 \theta_l + K_{15} \cos^2 \theta_l + K_{16} \cos \theta_l) \cos \theta_b \cos \theta + \\ & (K_{17} \sin \theta_l \cos \theta_l + K_{18} \sin \theta_l) \sin \theta_b \cos(\phi_b + \phi_l) \cos \theta + (K_{19} \sin \theta_l \cos \theta_l + K_{20} \sin \theta_l) \sin \theta_b \sin(\phi_b + \phi_l) \cos \theta \\ & + (K_{21} \cos \theta_l \sin \theta_l + K_{22} \sin \theta_l) \sin \phi_l \sin \theta + (K_{23} \cos \theta_l \sin \theta_l + K_{24} \sin \theta_l) \cos \phi_l \sin \theta + \\ & (K_{25} \cos \theta_l \sin \theta_l + K_{26} \sin \theta_l) \sin \phi_l \cos \theta_b \sin \theta + (K_{27} \cos \theta_l \sin \theta_l + K_{28} \sin \theta_l) \cos \phi_l \cos \theta_b \sin \theta + \\ & (K_{29} \cos^2 \theta_l + K_{30} \sin^2 \theta_l) \sin \theta_b \sin \phi_b \sin \theta + (K_{31} \cos^2 \theta_l + K_{32} \sin^2 \theta_l) \sin \theta_b \cos \phi_b \sin \theta + \\ & (K_{33} \sin^2 \theta_l) \sin \theta_b \cos(2\phi_l + \phi_b) \sin \theta + (K_{34} \sin^2 \theta_l) \sin \theta_b \sin(2\phi_l + \phi_b) \sin \theta \end{aligned}$$

Followed
by P_b

$$K_9 \propto -\alpha(\mathcal{T}^R + \mathcal{T}^L)$$

$$K_{10} \propto \alpha(\mathcal{T}^R - \mathcal{T}^L)$$

$$P_b = 0.06 \pm 0.07$$

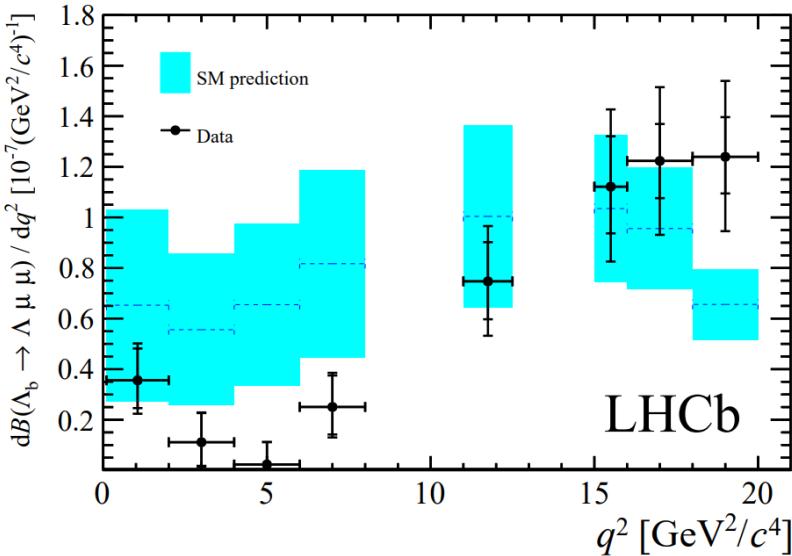
R.Aaij et al. (LHCb), Phys. Lett., B724, 27 (2013),

NUMERICAL RESULTS

TABLE I: \mathcal{B}_ℓ in units of 10^{-6}

	HBM	CQM	LCSR	LCSR	BSE	CQM	LCSR	RQM	Data
		[24]	[44]	[45]	[46]	[47]	[48]	[35]	[43]
\mathcal{B}_e	0.91(25)	1.0	4.6(1.6)		0.660 \sim 1.208		2.03(²⁶ ₉)	1.07	
\mathcal{B}_μ	0.79(18)	1.0	4.0(1.2)	6.1(^{5.8} _{1.7})	0.812 \sim 1.445	0.70		1.05	1.08(28)
\mathcal{B}_τ	0.21(2)	0.2	0.8(3)	2.1(^{2.3} _{0.6})	0.252 \sim 0.392	0.22		0.26	

- [24] T. Gutsche, M. A. Ivanov, J. G. Korner, V. E. Lyubovitskij and P. Santorelli, Phys. Rev. D 87, 074031 (2013).
- [44] T. M. Aliev, K. Azizi and M. Savci, Phys. Rev. D 81, 056006 (2010).
- [45] Y. m. Wang, Y. Li and C. D. Lu, Eur. Phys. J. C 59, 861 (2009).
- [46] L. L. Liu, X. W. Kang, Z. Y. Wang and X. H. Guo, Chin. Phys. C 44, 083107 (2020).
- [47] L. Mott and W. Roberts, Int. J. Mod. Phys. A 30, 1550172 (2015).
- [48] L. F. Gan, Y. L. Liu, W. B. Chen and M. Q. Huang, Commun. Theor. Phys. 58, 872(2012).
- [35] R. N. Faustov and V. O. Galkin, Phys. Rev. D 96, 053006 (2017).
- [43] R. L. Workman et al. [Particle Data Group], PTEP 2022, 083C01 (2022).



[13] R.Aaij et al. [LHCb], JHEP 1506, 115 (2015).

[49] W. Detmold and S. Meinel, Phys. Rev. D 93, 074501 (2016).

$$A_{FB}^i(q^2) = \frac{\int_0^1 \frac{d^2\Gamma}{dq^2 d\cos\theta_i} d\cos\theta_i - \int_{-1}^0 \frac{d^2\Gamma}{dq^2 d\cos\theta_i} d\cos\theta_i}{d\Gamma/dq^2}$$

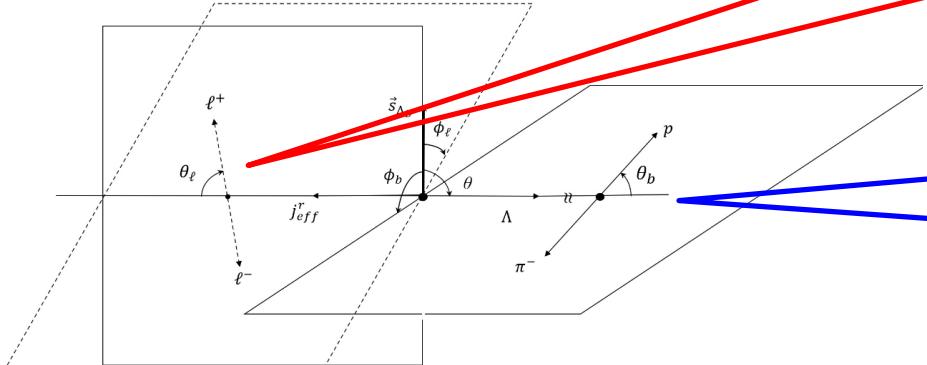
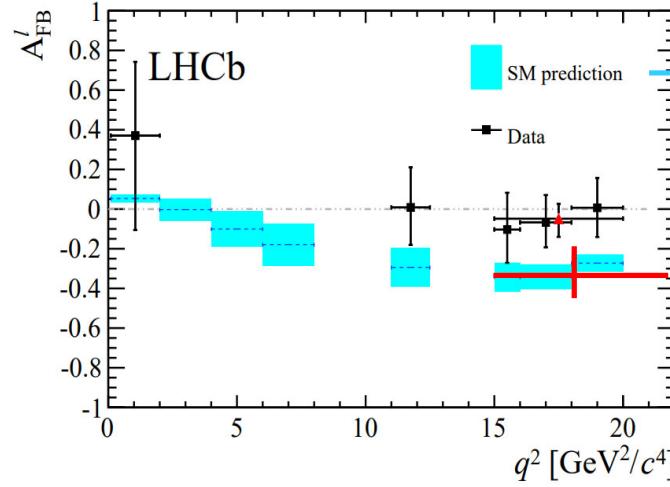
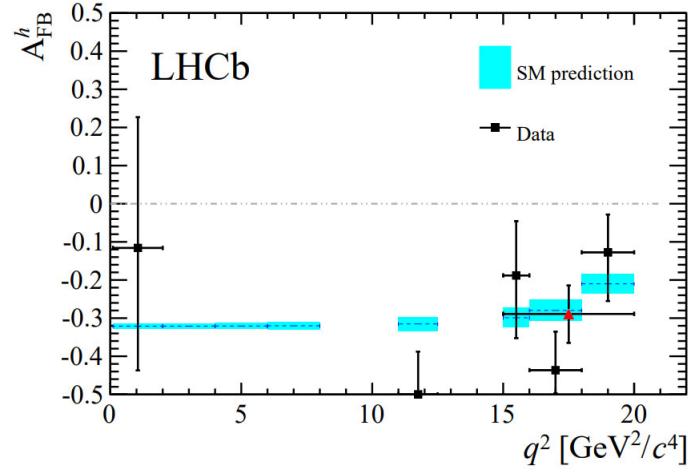


TABLE II: Decay observables, where $\langle \partial\mathcal{B}/\partial q^2 \rangle$ and $\kappa^{(\prime)}$ are in units of 10^{-7} GeV^{-2} and GeV^2 , respectively.

$[\kappa, \kappa']$	HBM	RQM [35]	lattice [49]	LHCb [13, 15]
$\langle \frac{\partial\mathcal{B}}{\partial q^2} \rangle$	[0.1, 2]	0.25(11)	0.34	0.25(23)
	[2, 4]	0.16(7)	0.31	0.18(12)
	[4, 6]	0.20(8)	0.40	0.23(11)
	[6, 8]	0.26(9)	0.57	0.307(94)
	[11, 12.5]	0.44(11)	0.65	0.75(21)
	[15, 16]	0.61(10)	0.72	0.796(75)
	[16, 18]	0.65(8)	0.68	0.827(76)
	[1.1, 6]	0.18(7)	0.34	0.20(12)
	[15, 20]	0.60(6)	0.61	0.756(70)
	[15, 20]	0.60(6)	0.61	1.20(26) ₍₂₇₎
A_{FB}^ℓ	[0.1, 2]	0.076(0)	0.067	0.095(15)
	[11, 12.5]	-0.357(6)	-0.35	0.01(20) ₍₁₉₎
	[15, 16]	-0.403(8)	-0.41	-0.374(14)
	[16, 18]	-0.396(9)	-0.36	-0.372(13)
	[18, 20]	-0.320(9)	-0.32	-0.309(15)
A_{FB}^h	[15, 20]	-0.369(7)	-0.33	-0.350(13)
	[0.1, 2]	-0.294(2)	-0.26	-0.310(18)
	[11, 12.5]	-0.408(2)	-0.30	-0.50(11) ₍₄₎
	[15, 16]	-0.384(4)	-0.32	-0.3069(83)
	[16, 18]	-0.358(6)	-0.31	-0.2891(90)



[49] W. Detmold and S. Meinel, Phys. Rev. D 93, 074501 (2016).

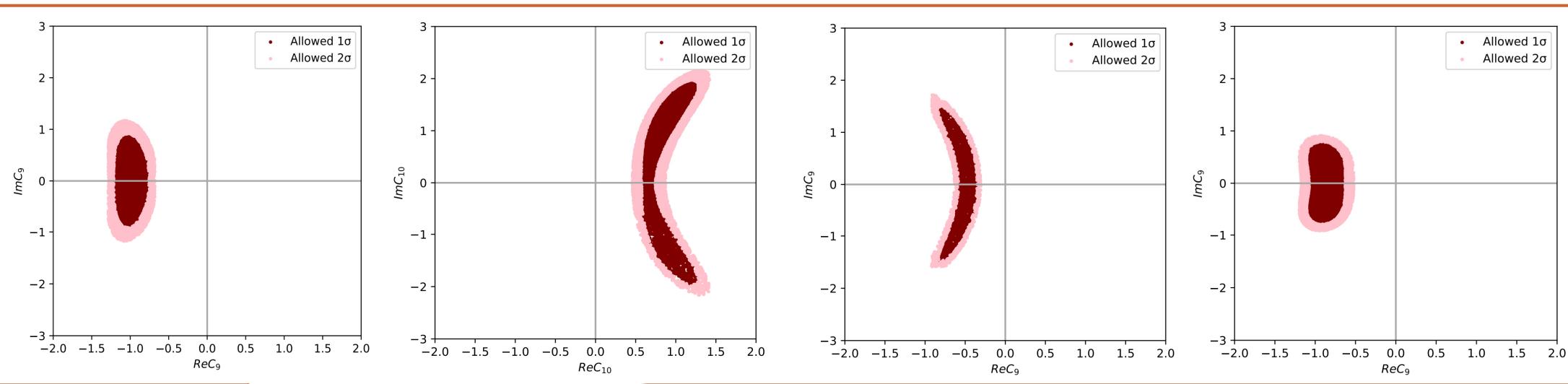


[13] R. Aaij et al. [LHCb], JHEP 1506, 115 (2015).

[15] R. Aaij et al. [LHCb], JHEP 09, 146 (2018).

TABLE II: Decay observables, where $\langle \partial\mathcal{B}/\partial q^2 \rangle$ and $\kappa^{(\prime)}$ are in units of 10^{-7} GeV^{-2} and GeV^2 , respectively.

	$[\kappa, \kappa']$	HBM	RQM [35]	lattice [49]	LHCb [13, 15]
$\langle \frac{\partial\mathcal{B}}{\partial q^2} \rangle$	[0.1, 2]	0.25(11)	0.34	0.25(23)	0.36(¹⁴ ₁₃)
	[2, 4]	0.16(7)	0.31	0.18(12)	0.11(¹² ₉)
	[4, 6]	0.20(8)	0.40	0.23(11)	0.02(⁹ ₁)
	[6, 8]	0.26(9)	0.57	0.307(94)	0.25(¹³ ₁₂)
A_{FB}^ℓ	[11, 12.5]	0.44(11)	0.65		0.75(21)
	[15, 16]	0.61(10)	0.72	0.796(75)	1.12(30)
	[16, 18]	0.65(8)	0.68	0.827(76)	1.22(29)
	[1.1, 6]	0.18(7)	0.34	0.20(12)	0.09(⁶ ₅)
	[15, 20]	0.60(6)	0.61	0.756(70)	1.20(²⁶ ₂₇)
A_{FB}^h	[0.1, 2]	0.076(0)	0.067	0.095(15)	0.37(³⁷ ₄₈)
	[11, 12.5]	-0.357(6)	-0.35		0.01(²⁰ ₁₉)
	[15, 16]	-0.403(8)	-0.41	-0.374(14)	-0.10(¹⁸ ₁₆)
	[16, 18]	-0.396(9)	-0.36	-0.372(13)	-0.07(¹⁴ ₁₃)
	[18, 20]	-0.320(9)	-0.32	-0.309(15)	0.01(¹⁶ ₁₅)
	[15, 20]	-0.369(7)	-0.33	-0.350(13)	-0.39(4)
	[0.1, 2]	-0.294(2)	-0.26	-0.310(18)	-0.12(³⁴ ₃₂)
	[11, 12.5]	-0.408(2)	-0.30		-0.50(¹¹ ₄)
	[15, 16]	-0.384(4)	-0.32	-0.3069(83)	-0.19(¹⁴ ₁₆)
	[16, 18]	-0.358(6)	-0.31	-0.2891(90)	-0.44(¹⁰ ₆)
	[18, 20]	-0.275(6)	-0.25	-0.227(10)	-0.13(¹⁰ ₁₂)
	[15, 20]	-0.333(4)	-0.29	-0.2710(92)	-0.30(5)



From B-meson $b \rightarrow s\ell^+\ell^-$
global fit

N.R.Singh Chundawat,
[arXiv:2207.10613 [hep-ph]].

$\langle K_{10} \rangle (\text{EXP}) = -0.045 \pm 0.037$

TABLE III: The Wilson coefficients and $\langle K_j \rangle$ in units of 10^{-3} , in four NP scenarios.

Scenarios	$\text{Im}(C_9^{NP})$	$\text{Im}(C_{10}^{NP})$	$\text{Im}(C_L)$	$\text{Im}(C_R)$	K_9	K_{10}	K_{19}	K_{30}	P_b
Scenario #1	± 0.73	0	0	0					
Scenario #2	0	± 1.86	0	0	0	∓ 4	0	0	-0.022(72)
Scenario #3	± 1.66	∓ 1.66	0	0	0	± 3	0	0	-0.021(65)
Scenario #4	± 0.77	0	∓ 0.77	∓ 0.77	∓ 1	∓ 42	∓ 1	0	-0.019(64)

$P_b = 0.06 \pm 0.07$
R.Aaij et al. (LHCb), Phys. Lett. B724, 27 (2013),

CONCLUSION

- Angular distributions of $\Lambda_b \rightarrow \Lambda(\rightarrow p\pi^-)\ell^+\ell^-$ have been examined.
- K_{10} is related to T-odd observables and sensitive to NP.
- The current K_{10} data can be explained with the existence of NP.

THANK YOU