



# CP violation measurement in two body B decays with the LHCb detector

Tutor: Julien Cogan

You LV(USTC)  
Zhanjiang Lian(THU)

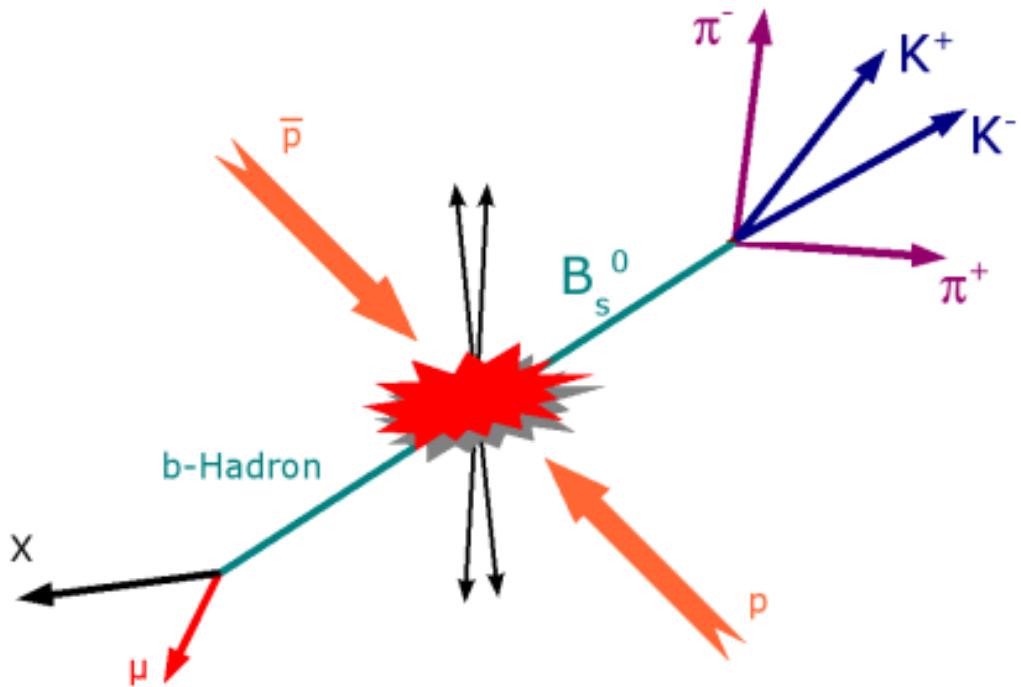
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# Outline



- **Introduction**
- **Working Process**
- **Experiment results**
- **Conclusion**

# Introduction



$$A_{CP} = \frac{\Gamma(B^0 \rightarrow K^+ \pi^-) - \Gamma(\bar{B}^0 \rightarrow K^- \pi^+)}{\Gamma(B^0 \rightarrow K^+ \pi^-) + \Gamma(\bar{B}^0 \rightarrow K^- \pi^+)}$$

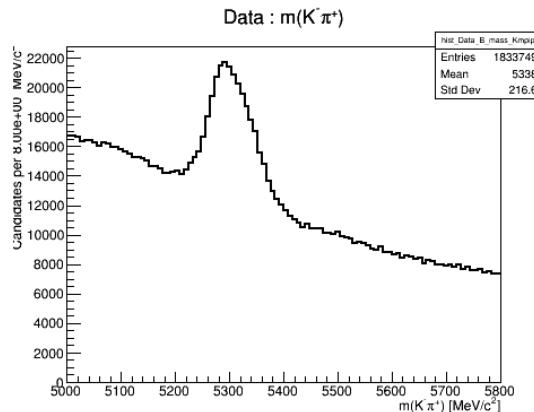
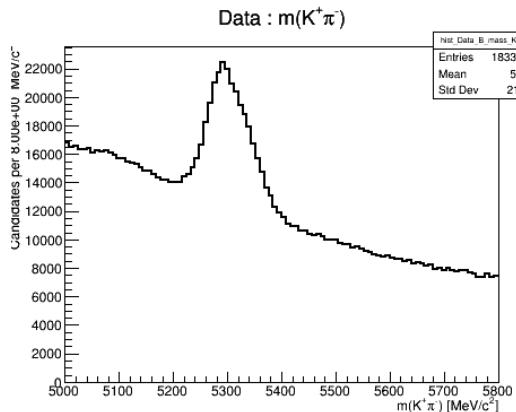
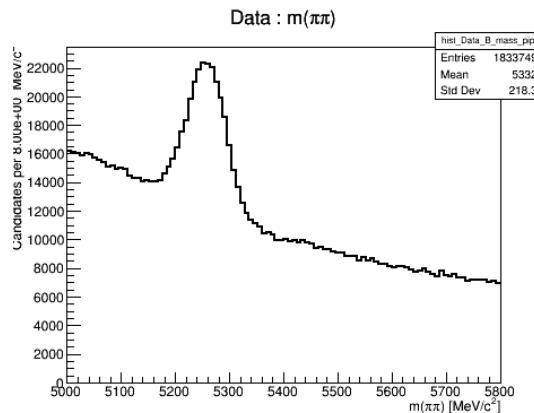
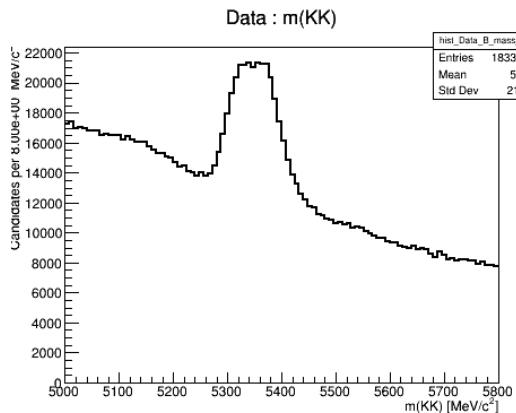
$$A_{CP} = A_{raw} - A_\Delta$$

# Introduction



B decay channel:  $B \rightarrow h^+ h^+$        $h = k, \pi$

B Invariant mass distribution without cut



# Working Process

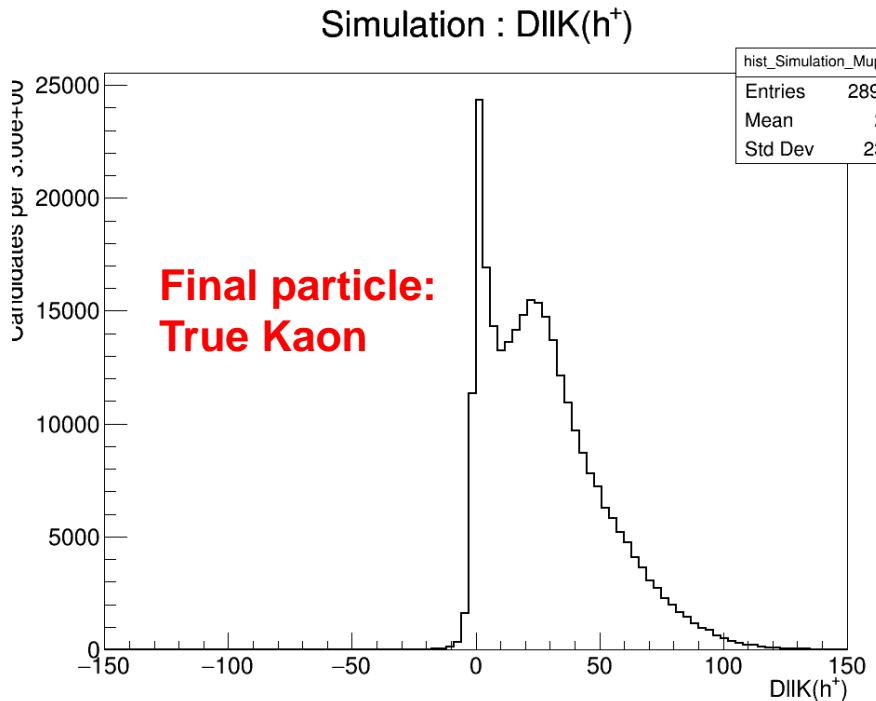


- Cut value for selection
- Analyzing the simulated data
- Result of the LHCb data

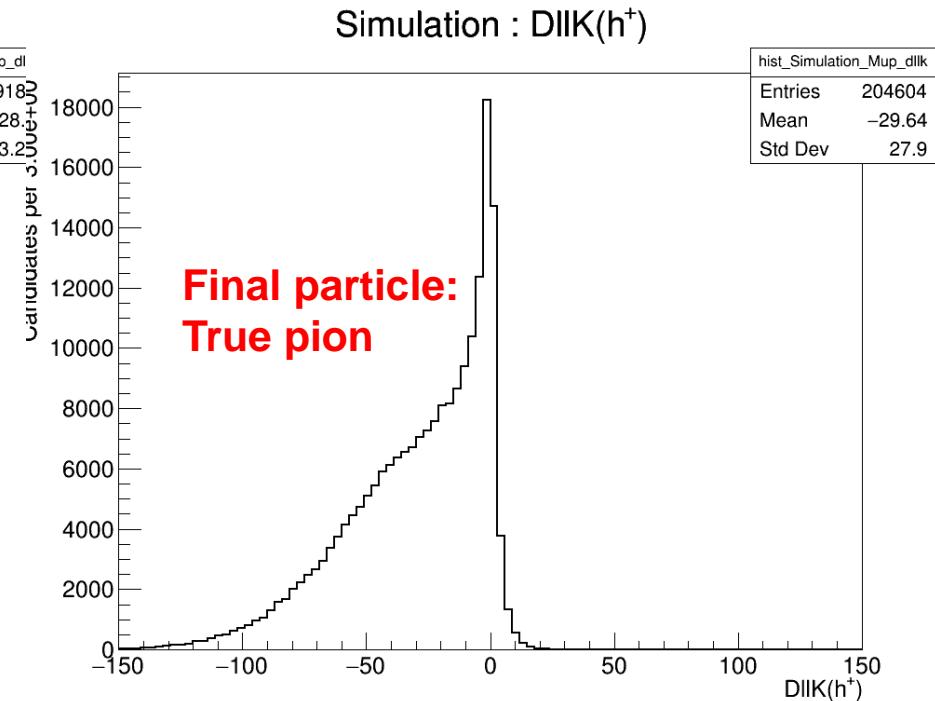
# Cut value for selection



## DIIk: Variable of particle identify

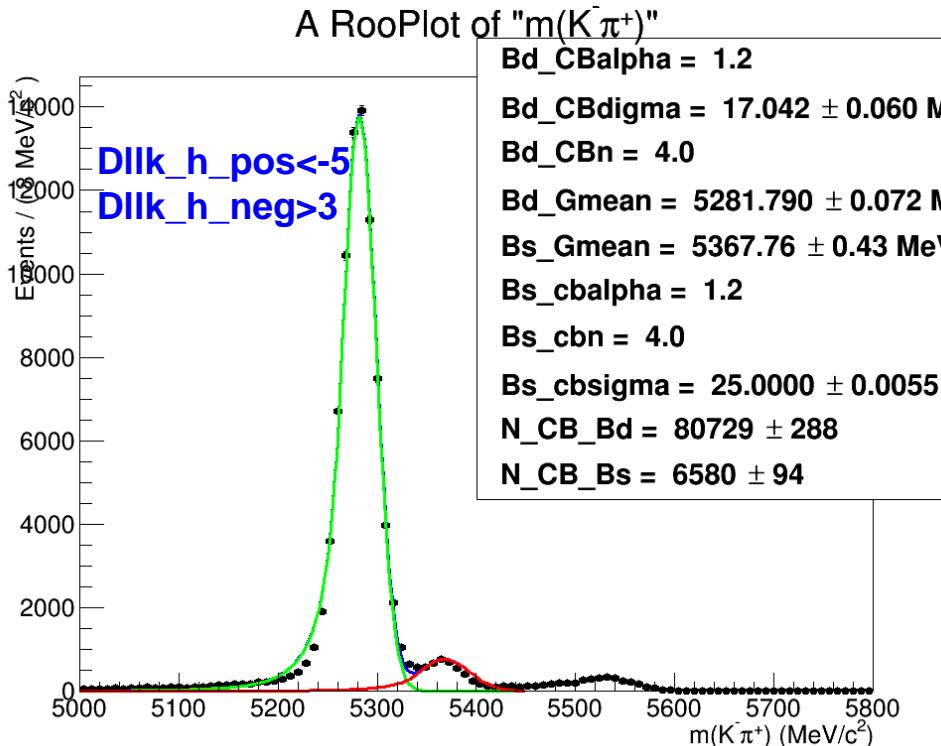
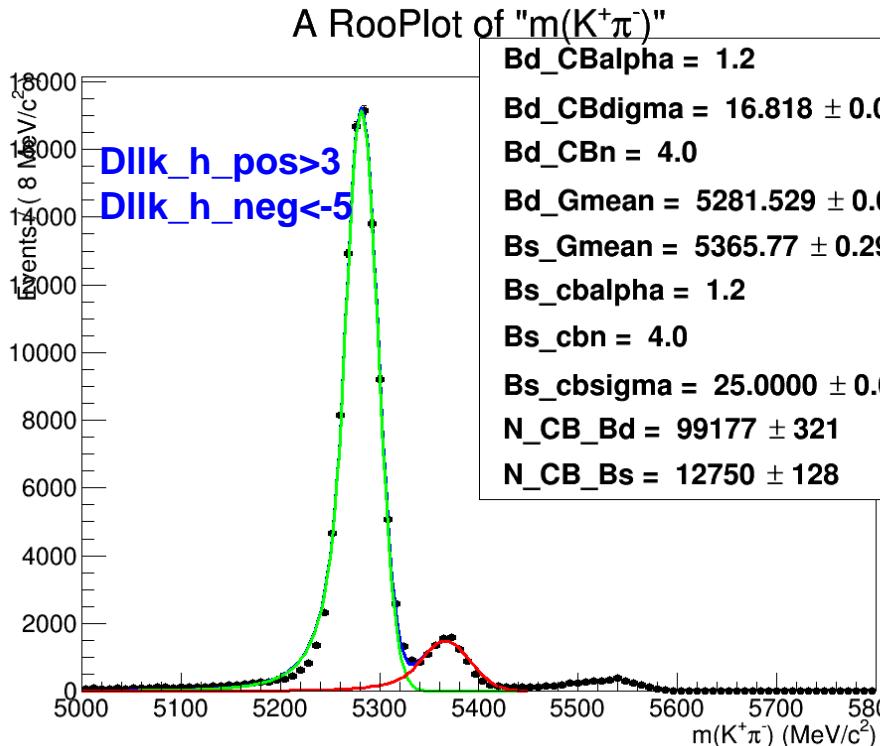


For Kaon:  $DIIk > 3$



For pion:  $DIIk < -5$

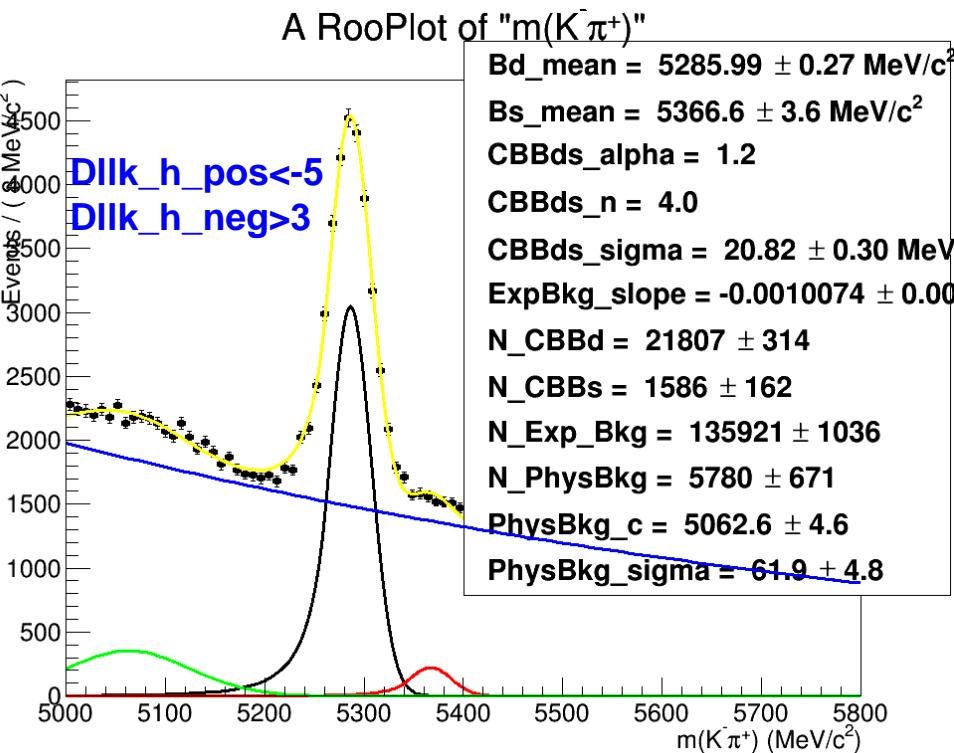
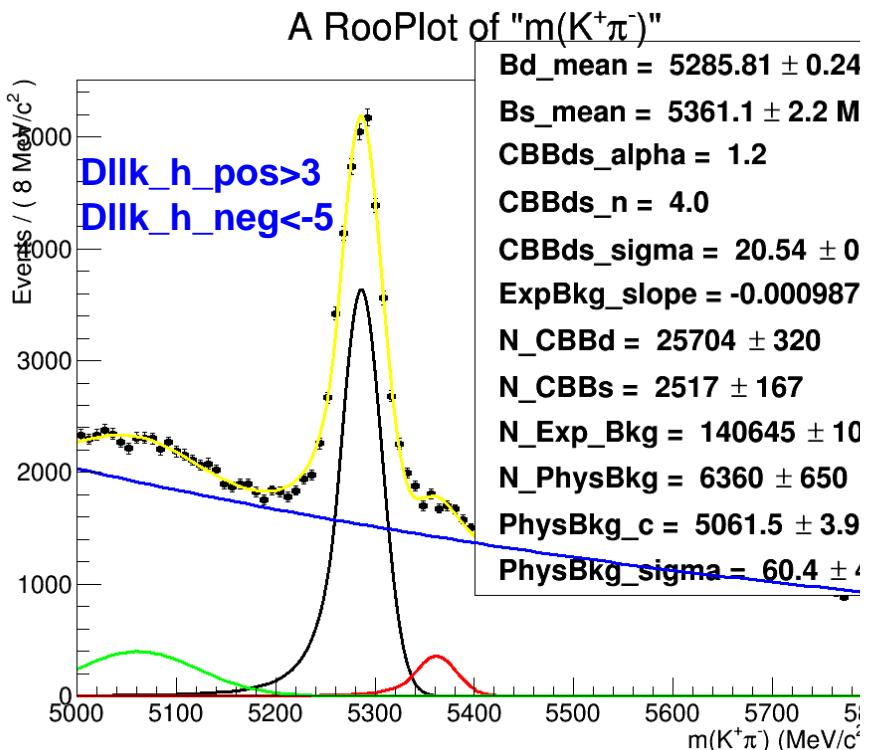
# Analyzing the simulated data



$$A_{raw}(Bd) = 0.103 \pm 0.002(stat)$$

$$A_{raw}(Bs) = 0.319 \pm 0.008(stat)$$

# Result of the LHCb data



$$A_{raw}(Bd) = 0.082 \pm 0.009(stat)$$

$$A_{raw}(Bs) = 0.227 \pm 0.058(stat)$$



# Conclusion

Aaij R, Beteta C A, Adeva B, et al. First Observation of C P Violation in the Decays of  $B \rightarrow D^0$  Mesons[J]. Physical review letters, 2013, 110(22): 221601.

Source		Result	Uncertainty
$A_{raw}(Bd)$	Simulation	0.103	0.002
	LHCb data(us)	<b>0.082</b>	<b>0.009</b>
	LHCb data(paper)	<b>-0.091</b>	<b>0.006</b>
$A_{raw}(Bs)$	Simulation	0.319	0.008
	LHCb data(us)	<b>0.227</b>	<b>0.058</b>
	LHCb data(paper)	<b>0.28</b>	<b>0.04</b>

# THANKS