

2019  
6-7 KWIETNIA

SYMPOZJUM  
MŁODYCH  
NAUKOWCÓW  
WYDZIAŁU FIZYKI UW



## Data/simulation corrections for the $B \rightarrow DX$ decays

*Maciej Giza<sup>1</sup>, Michał Suchorowski<sup>2</sup>*

Supervisor: dr. inż. Agnieszka Dziurda<sup>3</sup>

<sup>1</sup>*Faculty of Physics, University of Warsaw*

<sup>2</sup>*Faculty of Physics and Applied Computer Science, AGH University of Science and Technology*

<sup>3</sup>*The LHCb Experiment Department, Institute of Nuclear Physics, Polish Academy of Sciences*

The LHCb detector operating in LHC is a single-arm forward spectrometer focused on studying CP violation and search of rare decays [1]. During Particle Physics Summer Student Programme 2018 we worked on data/simulation corrections for the decay of B meson to D meson that included background from the lambda baryon decay [2]. This type of weak interaction has low statistic mode and contributes to our decay with an unknown branching ratio.

To find the correction, the calibration mode with control sample characterized by high statistic mode was used. Then we obtained pure signal simulation and its shape, the background shapes and also fitted shapes to data using invariant mass.

For data analysis, we took advantage of ROOT, Python and LHCb frameworks.

Although the impact of the lambda decay to the B meson decay was found, the fit stability could still be improved and further tests are needed to check whether it properly describe the process in other conditions. Finding such well-adjusted branching ratio could result in more precise simulations for the decays being the source of knowledge about the CP violation.

[1] A. A. J. e. a. Alves, *The lhcb detector at the lhc*, Journal of Instrumentation 3 (2008), no. 08 S08005

[2] Agnieszka Dziurda, *Studies of time dependent CP violation in charm decays of  $B^0_s$  mesons*, The Henryk Niewodniczański Institute of Nuclear Physics, Polish Academy of Sciences, Kraków, Poland, April 2015 r.