



## Search for the CPT symmetry violation in neutral flavour meson systems.

We are looking for physics students interested to join our Warsaw-LHCb group. **LHCb** is one of the four experiments which operate on the largest accelerator in the world - Large Hadron Collider at CERN in Geneva.

The aim of this project is to perform the feasibility studies for the search of CPT symmetry violation in the neutral B and D mesons systems. The CPT symmetry is conserved in all quantum field theories describing the particle interactions in the frame of Standard Model. Therefore, the experimental search for its violation belongs to the programme of so called **New Physics**. Precise CPT tests can be carried out by exploiting the neutral mesons (quark-antiquark) oscillations – one of the fascinating example of quantum mechanics phenomena.

In the frame of the topic, the estimate of the reconstruction efficiency and the background studies based on the Monte Carlo simulations and on experimental data samples, will be performed. The project gives opportunity to learn in practice the advanced method of machine learning (e.g. **neural networks, boosted decision trees**) in one of the best experiments in the world, as well as the modern information technologies (unit testing, git, programming language such as: **Python/C++14/C++17**).

The proposed projects can be extended to bachelor, master or doctora theses.

Detailed descriptions of some of the projects can be found here:

<http://koza.if.uj.edu.pl/~krzemien/projects.html>

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