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The project is devoted to understanding the basic discrete symmetry of Nature, called CP, and other issues of dynamics of heavy quarks. The CP symmetry represents a combination of the spatial inversion and conversion of matter into antimatter. Violation of this symmetry, although observed and extensively studied over decades, is still not explained at the most fundamental level of the electromagnetic and weak interactions between quarks. This especially concerns the heaviest quarks called charm and beauty. Precise measurements of the CP symmetry, and some other quantities contributing to the dynamics of heavy quarks, should help us to see of whether or not there exist new forces governing mutual transitions of quarks, as e.g. in oscillations of pairs of neutral mesons or some rare decays. We are particularly interested in the CP violation in decays of charm quarks where such effects has not yet been observed and are probably small. We are also aiming to determine how partons (quarks and gluons) are distruibuted inside protons. These studies are crucial for precise test of theoretical predictions and for searches of production of exotic particles, and other phenomena beyond our current understanding of elementary particle interactions.

The LHCb experiement, being performed at the European Organization for Nuclear Research (CERN), makes use of the most energetic proton-proton colliding accelerator. It has just started its second phase of operation where the centre-of-mass energy of collisions amounts to 13 TeV (Tera electron-Volts), exceeding all previous achievements in this field. Three groups from Polish institutes are deeply involved in physics issues, as mentioned above, and in the operational, computational and detector-related tasks. In particular, we develop software for simulations and event reconstruction, we do positioning of tracking detectors (so called alignment), and operate computing resources needed for production of enormous volumes of data amounting to some 10^{15} bytes yearly.