

CP violation and exotic matter with multibody decays of heavy baryons at the LHCb experiment

Research Project / Research Group Description:

The experimental study of baryonic decays of heavy hadrons can give access to CP violation within and beyond the Standard Model of Particles and Fields and also to exotic hadronic matter such as pentaquarks. Recently the LHCb experiment at the Large Hadron Collider (LHC) at CERN (Geneva, Switzerland) found the first evidence of CP violation in heavy baryon decays with a statistical significance of 3.3 standard deviations and discovered the existence of the pentaquark state, in both cases using multibody heavy baryon decays. Moreover, the search for the electric dipole moment of heavy baryons has been proposed as a new portal for searches of beyond Standard Model physics at the LHC. These measurements would largely benefit of an improved event reconstruction and phenomenological model of the decay amplitudes of multibody baryonic decays. In this project we aim to improve the experimental reconstruction of baryonic decays at LHCb by enhancing the understanding of the proton identification and tracking efficiency and to develop new phenomenological models for the description of the decay dynamics with half-integer spin particles.

Job position description:

The position has an experimental profile in particle physics, but requires both a strong theoretical background and excellent experimental and computational skills. The candidate will join the LHCb collaboration at CERN and will contribute to the operation, upgrade and physics analysis responsibilities of the host research group in one of the main operating detectors at the LHC. The work will be performed in a highly international and competitive environment, in collaboration with other participant institutions, particularly the INFN-Milan and University of Milan (Italy), with whose LHCb research group there is a long-standing collaboration. The program of academic activities at the IFIC and the experience of the research team members and international collaborators will complete a warm, excellence working atmosphere. Under the supervision of his/her advisor(s), the candidate is expected to take a leadership role in the research project, main aspect of the job. Travelling and a significant presence at CERN are foreseen.

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Research project/Research Group website

<http://ific.uv.es/lhcb/>



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