

Heavy Flavour Hadron Spectroscopy: An Overview

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Abstract

There is strong motivation to understand the effective interaction among heavy quarks and anti-quarks) since it is expected to be cleaner than those at the light flavor sector. There exist theoretical and experimental evidences to uphold the various predictions of quantum chromo dynamics such as the hadron spectroscopy, decays and production rates etc. The quarkonium and open flavour spectroscopies challenge our understanding of QCD. The field is evolving in an interesting and exciting way, and many years (perhaps decades) of intense effort both on the experimental as well as on the theoretical side is required to understand many of the recently observed exotic hadrons by identifying their status and assigning their spin parity states. In the heavy flavor sector non-relativistic treatment with constituent quark model is justified and the perturbative QCD contributions (such as one gluon exchange) are more adequate and chiral fields are less important. Here in this talk, a comprehensive over view of the work done during the past few years in the field of heavy flavor hadron spectroscopy will be presented. Apart from the conventional quark structure (quark – antiquarks structure for the mesons and three quarks structure of baryons) of hadrons, the multi-quark hadrons and the hadron molecular states etc., also will be reviewed. Various issues and challenges in understanding the physics and dynamics of the quarks at the hadronic dimensions will be highlighted. Looking into the present and future experimental prospects at different heavy flavour laboratories like BES-III, CLEO-c, BaBar, Belle, LHC, *etc.*, the scope for theoretical extensions of the present knowledge of heavy flavour physics would be very demanding. In this context, many relevant contributions from the forthcoming PANDA facility are expected. Scopes and outlook of the hadron physics at the heavy flavor sector in view of the future experimental facilities will be highlighted.

