



Contribution ID: 139

Type: Oral

Perspective study of heavy flavour mesons and baryons

Monday, 31 August 2015 17:00 (15 minutes)

The D-meson spectroscopy together with the spectroscopy of charmed and strange baryons is discussed. A large number of D-mesons produced in pair at the threshold can be used to study rare processes in the charm system like CP-violation, flavour mixing, rare decays. The expectation from the standard model is that CP-violation is large for K-system and B-system but small for D-system. A deviation from this small effect indicating “new physics” can be thus easier distinguished in the D-system than in K- and B-systems. Leptonic decays of D- and Ds mesons open the road to understanding the hadron structure. They probe quark wave functions and represent themselves as a good test for lattice QCD. An understanding of the baryon spectrum is one of the primary goals of non-perturbative QCD. In the nucleon sector, where most of the experimental information is available, the agreement with quark model predictions is astonishingly small, and situation is even worse in strange and charmed baryon sector. For this purpose a detailed analysis of spectrum of flavour mesons and baryons is given. The recent experimental data from different collaborations are analyzed. Many heavy mesons and baryons with charm and strangeness are expected to exist in the framework of the proposed combined approach. But much more data on different decay modes are needed before firmer conclusions can be made. These data can be derived directly from the experiments with high quality antiproton beam with momentum up to 15 GeV/c planned at FAIR.

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Session Classification: Hadron Structure, Spectroscopy, and Dynamics II