

A NEW STRUCTURE OF BARYONS AND INTRINSIC HEAVY QUARK MECHANISM AS A SOLUTION OF SELEX-LHCb DOUBLE-CHARM BARYON CONFLICT

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In this talk we discuss the apparent conflict between measurements of double-charm baryons by the SELEX fixed-target experiment and the LHCb experiment at the LHC collider. We show that both experiments are compatible, and that both results can be correct.

Double-charm baryons are among the most intriguing objects in modern baryonic physics. In the early 2000's the SELEX experiment published the first observation of signal events in two charged decay modes at mass $3520 \text{ MeV}/c^2$ [1, 2]. This result caused some criticism from the theoretical point of view due to the unexpectedly high production rate and the short lifetime.

The LHCb high statistics observation [3] of a doubly-charm baryon state at $3620 \text{ MeV}/c^2$ caused another wave of criticism of the SELEX result due to the mass discrepancy.

In our recent research we show that using intrinsic charm in the production mechanism we can fully describe the SELEX production rate [4]. Introducing the $[cu]c$ doubly-charm baryon structure (with a spin zero diquark) in comparison with “classical” $(cc)u$ (with a spin-1 diquark) can explain the SELEX-LHCb mass difference [5].

References

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