PL9902527

Search for Charmed Hyperon Decay $\Xi_c^0 \to \Lambda K_s^0$

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Up to now only the ARGUS experiment[1] has reported the observation of 7.4 ± 3.2 events of the decay in question.

Our search for the decay $\Xi_c^0 \to \Lambda K_s^0$ was peformed in the sample of 3.5 millions of hadronic Z^0 decays collected in $1992 \div 95$. The K_s^0 mesons were selected by reconstructing their decay into $\pi^+\pi^-$ while Λ hyperons were found by the observation of their decays into $p^+\pi^-$ pairs[1] Heavy baryons produced in e^+e^- annihilations at LEP carry a substantial part of energy of their primary quarks. Therefore the pairs ΛK_s^0 were accepted only if their momenta exceeded 9 Gev. In the distribution of ΛK_s^0 invariant mass the peak is seen at the Ξ_c^0 mass (Fig. 1). The spectrum of Fig. 1 has been fitted assuming a Gaussian signal around 2.47 GeV and the background parametrized by a second order polynomial. The fit yields $40.5^{+11.2}_{-10.8}$ events of the decay in question with the fitted Ξ_c^0 mass of (2474 ± 5) MeV and the width of (14 ± 4) MeV consistent with experimental mass resolution. The ΛK_s^0 hypothesis is further confirmed by fitting a common vertex of Λ and K_s^0. The invariant mass distribution of ΛK_s^0 pairs for the events passing the fit exhibits the signal of similar strength with reduced width.

Preliminary estimate of the product $f(\Xi_c^0) \times BF(\Xi_c^0 \to \Lambda K_s^0)$, where $f(\Xi_c^0)$ denotes the sum of probabilities of b and c quarks fragmentation into the baryon Ξ_c^0, gives $(1.25 \pm 0.30) \times 10^{-3}$. This suggests fairly large $BF(\Xi_c^0 \to \Lambda K_s^0)$, since $f(\Xi_c^0)$ is expected not to exceed few percent.

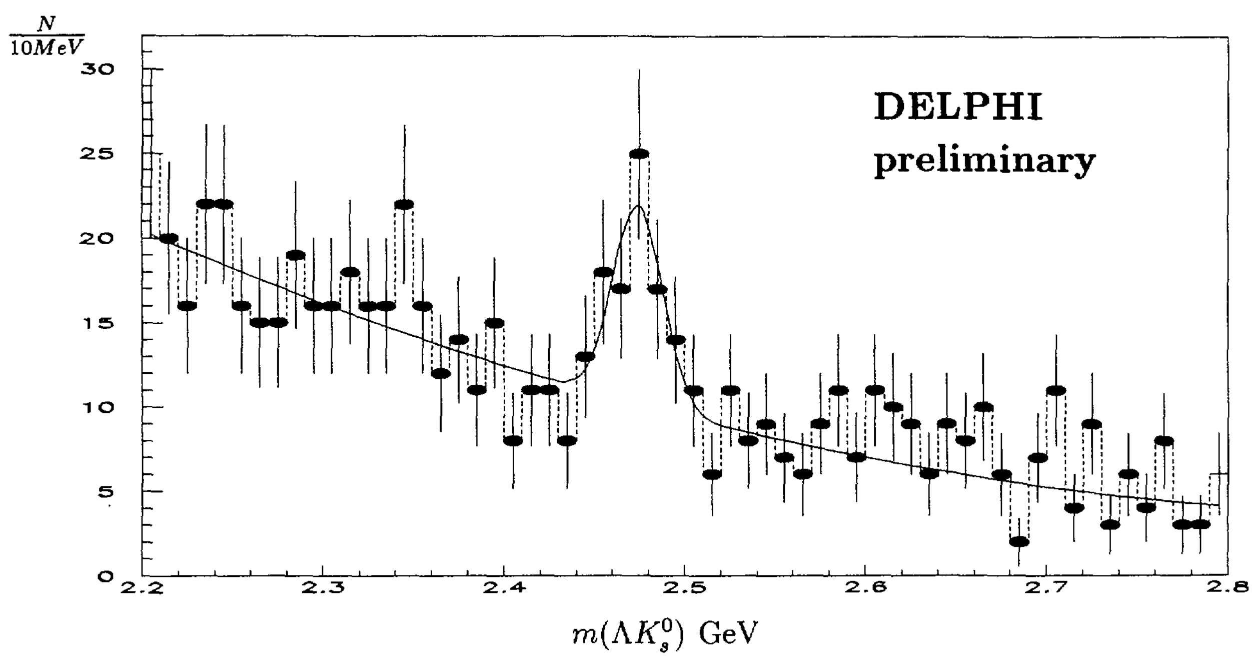

Fig. 1: The ΛK_s^0 mass spectrum.

References:

[1] H. Albrecht et al., (ARGUS collaboration) Phys. Lett. **B342** (1995) 397.

[1]Hereafter a particle symbol stands for a particle *and* an antiparticle. Thus e.g. $\Lambda^0 \to p\pi^-$ stands also for a $\overline{\Lambda^0} \to \bar{p}\pi^+$.