Doubly strange stable dibaryon and hyperon production in p+C collision at 10GeV/c

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Abstract

A reliable identification of the above events needs a multivertex kinematic analysis which is in turn feasible only using 4π-detectors and high measurement precisions of the sought objects. The preliminary estimate of the total cross sections for Λ production(7200-events) is σ_Λ= 5.0 mb. Several $\Xi^- \to \Lambda + \pi^-$ hyperons (20-events) identified (applied ionazation and kinematic fits data)in these collisions with an effective cross section of 1300-600 nb, have been found. The total cross section of H-particle production formulated with coalescence model is about 2.6μb in Ne+Ne collisions and 0.2μb in the p+Ne collisions at a momentum of 5 GeV/nucleon. Eight events were identified as dibaryon via a multivertex kinematic analysis. The average lifetime for a weak decay of stable dihyperons exceeds 3.3 $10^{-10}s$. The estimate of the dihyperon production cross section in $p^{12}C$ -collisions at 10 GeV/c is less than 100 nb. The stable S=-2 dibaryon is confined to the following energetic level scheme: a) the H^0 ground state of M_{H^0}=(2146.3$\pm$1.0) Mev/c^2; b)the first H^0_1 excited state of $M_{H^0_1}$=(2203.0$\pm$5.9)MeV/c^2; c) The second excited state of heavy H with $M_{H^0_2}$= (2396.9$\pm$17.3) MeV/c^2. The heavy dibaryon H^+ of M_{H^+}= (2392.6$\pm$23.6) MeV/c^2 exists well charged counterpart. Recently we have observed two other events interpreted as a S=-2 positively charged heavy H^+-dibaryon.