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 σΛ = 5.0 mb. Several Ξ− → Λ + π− 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 10−10s. The estimate of the dihyperon production cross section in p12C -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 H0 ground state of M_H0=(2146.3±1.0) MeV/c²; b) the first H0 excited state of M_H0=(2203.0±5.9)MeV/c²; c) The second excited state of heavy H with M_H0=(2396.9±17.3) MeV/c². The heavy dibaryon H+ of M_H+(2392.6±23.6) MeV/c² exists well charged counterpart. Recently we have observed two other events interpreted as a S=-2 positively charged heavy H+-dibaryon.