kbar and at room temperature, and which has a monoclinically distorted structure of the SnS type [5].

We observed transitions of Sb-III into the superconducting state in the pressure region 90 - 100 kbar. The transition temperature in this pressure interval was practically independent of the pressure (T_c = 3.52°K at p = 93 kbar and T_c = 3.53°K at p = 100 kbar). This result agrees well with the data of [6], where the superconductivity of antimony was specially investigated in the pressure interval 85 - 150 kbar, both when it comes to the value of T_c (T_c = 3.55°K at p = 85 kbar), and when it comes to dT_c/dp.

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PRODUCTION OF Ξ^- HYPERONS IN π^-p INTERACTIONS AT 5.1 GeV/c

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We report here the observation of the decays of the cascade hyperon $\Xi^- \to \Lambda + \pi^-$ and a determination of its production cross section in π^-p interactions at 5.1 GeV/c in a meter propane bubble chamber [1].

We selected for the analysis events satisfying the π^-p interaction criteria, where the negative secondary track emerging from the star had the kink characteristic of the $\Xi^- \to \Lambda + \pi^-$ decay; the V^0-particle decay was associated with this kink. Double scanning of 230 000 photographs (with efficiency 93%) yielded 28 such events.

The selected events were measured and then processed with a BESM-4 computer using the geometrical reconstruction programs [2] and kinematic identification [3]. An event was identified as a Ξ^--hyperon decay if its kinematics agreed with the $\Xi^- \to \Lambda + \pi$ decay, the ionization of each of the tracks did not contradict the Ξ^--decay hypothesis, and the effective $(\Lambda + \pi^-)$ mass did not differ from the mass M_{Ξ^-} = 1321 MeV/c^2 by more than 50 MeV/c^2 (corresponding approximately to five standard deviations in the effective mass). These criteria were satisfied for 6 of the 28 events.

The main source of the background was the imitation of the $\Xi^- \to \Lambda + \pi^-$ decay by inelastic interactions of secondary negative particles with the quasi-free neutron of carbon:

$$\pi^- + n \to \pi^- + \Lambda + (K^0, m\pi^0),$$
$$K^- + n \to \pi^- + \Lambda + (m\pi^0),$$

$$K^- + n \to K^- + \Lambda + (K^0, m\pi^0),$$
$$\Sigma^- + n \to \pi^- + \Lambda + (n, m\pi^0).$$

The analysis has shown that none of the six selected events can be related to these background reactions.

The kinematic parameters of the Ξ^- hyperon, obtained from the analysis of the $\Xi^- \to \Lambda + \pi^-$ decay, were used to identify the reaction channel in which the Ξ^- hyperon was produced. For all six events, the reaction channel was identified uniquely:

$$\pi^- p \to \Xi^- K^0 K^0 \pi^+ \quad - \quad 1 \text{ event}$$
$$\pi^- p \to \Xi^- K^0 K^+ \pi^0 \quad - \quad 2 \text{ events}$$
$$\pi^- p \to \Xi^- K^0 K^+ \quad - \quad 3 \text{ events}$$

The total Ξ^--hyperon production cross section was obtained from the cross section for one event in the given experiment (0.27 μb/event) [4] with allowance for the corrections for the weights of the Ξ^- hyperons and the scanning efficiency, and equals

$$\sigma = (2.9^{+1.8}_{-1.0})\ \mu\text{b}.$$

The cross section obtained by us is compared in the table with the cross sections obtained for Ξ^--hyperon production in $\pi^- p$ interactions at other energies.

π^- momentum, GeV/c	Number of events	Cross section, μb	Reference
3.0	1	1 ± 1	[5]
4.0	5	$1.5^{+0.7}_{-0.6}$	[6]
5.1	6	$2.9^{+1.8}_{-1.0}$	Our data
5.5	2	$2.3^{+3.1}_{-1.6}$	[7]
6.8	1	$3.6^{+2.5}_{-2.1}$	[8]
8.0	10	$10.6^{+4.4}_{-3.2}$	[8]
10.0	12	15.5 ± 4.5	[9]

As seen from the table, the cross section for the production of Ξ^- hyperons in $\pi^- p$ interactions increases smoothly with the energy, within the limits of experimental errors.

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STUDY OF THE MASS SPECTRUM OF THE ΛK SYSTEM IN π^-p INTERACTIONS AT 4 AND 5.1 GeV/c

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We report here the results of the study of the effective-mass spectrum of the ΛK system, obtained in an investigation of π^-p interactions in the 24-liter [1] (High-energy Laboratory) and the meter [2] (Nuclear Problems Laboratory) propane bubble chambers irradiated by 4 and 5.1 GeV/c pion beams, respectively, from the JINR proton synchrotron.

The structure of the effective-mass spectrum of the ΛK system is of interest from the point of view of observing new resonances with zero strangeness and the decays of various isobars in the $N^* \to \Lambda + K$ channel for the purpose of determining the relative probabilities of such decays.

The first serious indication of the existence of a resonance structure in the K effective-mass spectrum was obtained in [3], where a resonance of mass $M_{\Lambda K^+} = (1700 \pm 25)$ MeV/c^2 and width $\Gamma = (170 \pm 50)$ MeV/c^2 was observed in the reaction $\pi^-p \to \Lambda K^+\pi^-$ at 6 GeV/c. This resonance can be attributed to the isobar decay $N^*(1688) \to \Lambda + K^+$. A peak in the effective-mass spectrum of ΛK^0 and ΛK^+, with $M = (1755 \pm 21)$ MeV/c^2 and $\Gamma = (221 \pm 58)$ MeV/c^2, produced in a π^+p interaction at 8 GeV/c, was reported in [4]. The existence of this peak is attributed to the decay of the isobars $N^*_{1/2}(1710)$ and $N^*_{1/2}(1750)$. The mass spectra obtained in [5] for the ΛK system in pp interactions at 8 GeV/c agree with the presence of a resonance with $M = 1777$ MeV/c^2 and width $\Gamma = 345$ MeV/c^2. Finally, in [6] they observed an appreciable excess of events over the background in the ΛK mass spectrum at $M \approx 1680$ MeV/c^2 in the photoproduction reaction $\gamma p \to \Lambda K^0\pi^+$ (π^0.....), and the existence of this peak cannot be attributed to the decay of an isobar N* with mass cloase to 1680 MeV/c^2, since no isobar $N^*(1680) \to p\pi^-$ was observed in the reaction $\gamma p \to p\pi^-\pi^+$.

The data that follow were obtained by processing approximately 230 000 photographs from the 24-liter chamber and 230 000 photographs from the meter chamber. The photograph processing procedure was described in earlier papers (cf., e.g., [7, 8]).

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