USSR STATE COMMITTEE FOR UTILIZATION OF ATOMIC ENERGY

INSTITUTE FOR HIGH ENERGY PHYSICS

И Ф В Э 85-19
ОЭФ

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Abstract

Bitukov S.I., Viktorov V.A., Golovkin S.V. et al. Study of $D(1285) \to K^+K^+\pi^0$ Decay and D(1285) and E(1420)-Mesons Production in Exclusiv Reactions Indused by π^-- and K^--Mesons at 32.5 GeV/c: IHEP Preprint 85-19. – Serpukhov, 1985. – p. 13, figs. 6; refs. 12.

D(1285) and E(1420)-mesons production in charge exchange reactions indused by π^- and K^--mesons at 32.5 GeV/c has been studied. The measured cross sections allowed one to derive limitations for the mixing angle in the axial-vector meson nonet. This means that E(1420)-meson consists mainly of strange quarks.

The invariant mass distribution for the kaon pair in $D(1285) \to K^+K^-\pi^0$ decay with statistics by an order of magnitude higher than the available data was obtained. The differential spectrum $dN/dm_{K^+K^-}$ analysis carried out in the δ-dominance model shows that δ(980)-meson cannot be described as a Breit-Wigner resonance with small width. The effective width for δ-meson at the point of $\sqrt{s} = 1$ GeV/c^2 Γ_δ is greater than 180MeV/c^2. It points to a strong coupling of δ-meson to hadrons.

Аннотация

Битюков С.И., Викторов В.А., Головкин С.В. и др. Исследование распада $D(1285) \to K^+K^-\pi^0$ и образования D(1285)- и E(1420)-мезонов в эксклюзивных взаимодействиях отрицательно заряженных пионов и каонов при импульсе 32,5 ГэВ/с: Препринт 85-19. – Серпухов, 1985. – 13 с., 6 рис., библиогр.: 12 назв.

В работе исследованы процессы образования D(1285)- и E(1420)-мезонов в реакциях перезарядки π^-- и K^--мезонов с импульсом 32,5 ГэВ/с. Измеренные сечения позволили получить ограничение на угол смешивания в нонете аксиальных мезонов, что означает, что E(1420)-мезон состоит в основном из странных кварков.

Получено распределение по инвариантной массе каонной пары в распаде $D(1285) \to K^+K^-\pi^0$ со статистикой, на порядок превышающей результаты предыдущих исследований. Анализ дифференциального спектра $dN/dm_{K^+K^-}$, проведенный в модели δ-доминантности, показал, что δ(980)-мезон не может быть описан как брейт-вигнеровский резонанс с малой шириной. "Эффективная" ширина δ-мезона в точке $\sqrt{s} = 1$ ГэВ/с^2 $\Gamma_\delta > 180$ МэВ/с^2, что указывает на сильную связь δ-мезона с адронами.

All the candidates for scalar and axial mesons nonets have already been defined at present. They are

$J^P = 1^+$: $A_1(1240)$, $D(1285)$, $E(1420)$, $Q_A(1330)$

$J^P = 0^+$: $\delta(980)$, $\epsilon(1300)$, $S^*(975)$, $K(1350)$.

The properties of these families are known rather worse as compared to the properties of pseudoscalar and vector ones. For instance, we do not practically know the mixing angle in the axial nonet, or, which is the same, the quark composition of D(1285) ($J^{PC} = 1^{++}$, I=0) and E(1420) ($J^{PC} = 1^{++}$, I = 0), because in this case traditional methods to derive the mixing angle from the radiation widths cannot be applied since the $e^+e^- \to D(E)$ transition is prohibited by C-parity; $D(E) \to \gamma\gamma$ by Yang-Landau theorem, and the decays $D(E) \to \omega\gamma$, $\phi\gamma$ have a small relative width (BR) $\sim 10^{-3} \div 10^{-4}$ and have not yet been observed. Therefore the only information we have is provided by Gell-Mann-Okubo mass formulas, however because of great uncertainty in the masses A_1 and Q_A, the accuracy of this method leaves much to be desired: $\delta_A = 16^\circ \pm 12^\circ$ ($\delta_A = \theta_A - 35^\circ$ is the mixing angle counted from the ideal one). Thus E(1420) meson may be either a pure $s\bar{s}$ (δ_A=0) state or it may contain quite a considerable fraction of unstrange quarks $\frac{1}{\sqrt{2}}(u\bar{u}+d\bar{d})$.

In this experiment the estimate for the mixing angle δ_A has been obtained from the D and E-meson production cross section ratios in charge exchange reactions in the π^--meson beam [1]. We used the following equality

$$\frac{\sigma(\pi^- p \to E+n)}{\sigma(\pi^- p \to D+n)} = tg^2\,\delta_A \qquad (1)$$

The relations of this type have been checked for vector and pseudoscalar nonet [5] in a wide energy range. For instance, at E_π –> 6 GeV $\sigma(\pi p \to \phi n)/\sigma(\pi p \to \omega n) = 0{,}0035 + 0{,}001$, whereof $\delta_V = 3.38^\circ$ was obtained from the comparison of the widths

$\Gamma_{\omega \to e^+e^-}$ and $\Gamma_{\phi \to e^+e^-}$). For the pseudoscalar nonet the value of the mixing angle defined in this way is $\theta_p = -18.2^\circ \pm 2.3^\circ$ ($\theta_p = 18^\circ \pm 4^\circ$ from widths $\Gamma_{\eta \to \gamma\gamma}$ and $\Gamma_{\eta' \to \gamma\gamma}$) and with account for the recent Crystall-Ball/6/ data)

Note, that relation (1) is valid only at sufficiently high energies, where no data were available for the cross section of the reactions

$$\pi^- p \to D(1285) + n \qquad (2)$$

$$\pi^- p \to E(1420) + n \qquad (3)$$

before our experiment.

Hence, to study D- and E-meson quark composition we have measured the cross sections for reactions (2)-(3) at E=33 GeV. D- and E-mesons were detected in the $K^+K^+\pi^0$ mode.

The scalar meson properties are in contradiction with those expected from the "naive" quark model ($q\bar{q}$; L=1; S=1). For example, it predicts that $m_{S^*} - m_\delta \approx 200$-$300$ MeV, $m_\delta = 1.7$-1.8 GeV, $\Gamma_\delta \approx 250$ MeV.

That is why attempts were made to give an alternative description of the scalar nonet, i.e. as a nonet of four-quark mesons ($q\bar{q}q\bar{q}$) or hybrid states ($q\bar{q}g$).

A very small width for δ-meson observed experimentally is particularly puzzling.

The study of scalar meson properties in hadron reactions is connected with certain difficulties which mainly arise due to a complicated model-dependent phase analysis.

A very interesting opportunity in scalar meson studies arises from the investigation of $\psi \to \phi(\omega) S^*_{\hookrightarrow \pi\pi KK}$, $D(1285) \to \delta\pi$ decays. A "pure" initial state and conservation laws lead to the scalar meson production in backgroundless conditions.

In our experiment/2/ we investigated the decay

$$D(1285) \to K^+K^-\pi^0. \qquad (4)$$

This study gave us data on $\delta(980)$ meson propagator.

measurements were made on the experimental setup "Lepto... at the IHEP accelerator.

"Lepton-F" is a modified version of the setup "Lepton"/4/. It consists of a combined spectrometer, which allows one to detect quite efficiently processes with simultaneous emission of charged hadrons and photons. Here are the basic elements of "Lepton-F" (fig. 1):

1). Primary beam detectors (scintillation counters S_1-S_3, hodoscopes H_1, proportional chambers PC_1-PC_2, gas Cerenkov counters $\check{C}_1$-$\check{C}_3$ to identify π-and K-mesons).

2) Target (40 cm of LiH) with counters (S_4-S_6) to detect interactions and a guard system (A_1-A_8) to select exclusive processes.

3). Wide aperture magnetic spectrometer with proportional chambers PC_3- PC_6 and scintillation hodoscopes H_2-H_3.

4). Cerenkov threshold counter C_4 to identify charged secondaries.

5). Active converter H_4-H_5 to to form a triggering signal with a photon.

6). Hodoscope multichannel γ-spectrometer GAMS-200 /7/.

7). System of trigger logics and data acquisition.

8). Data analysis system based on a two-computer complex EC-1010-EC-1040 on-line with the setup.

The total number of the channels to detect information from "Lepton-F":

proportional chambers - 4500
scintillation counters - 250
shower Cerenkov counters of the γ-spectrometer - 208
gas Cerenkov counters - 4.

During the experiment the effective π^- flux of $2\cdot 10^{11}$ particles and K^--meson flux of $4\cdot 10^9$ particles passed through the setup. The beam intensity was $4\cdot 10^6$ ppc. The setup was put into operation by several types of simultaneous triggering signals to select the reactions:

Trigger T_A - for the reaction	$\pi^- p \to K^+K^-\pi^0 n$	(5)
Trigger T_B - for the reaction	$K^- p \to K^+K^- Y$	(6)
and	$K^- p \to K^+K^-\pi^0 Y$	(7)
Trigger T_C for the reaction	$K^- p \to$ neutrals	(8)

The triggers T_A and T_B selected two slow charged particles in the final state (higher amplitudes in the counters S_4 and S_5, two clusters in the hodoscopes H_2, H_3 and no signals in the Cerenkov counter $\check{C}_4$, whose threshold was $\gamma = (E/m)_{thresh} = 48$).

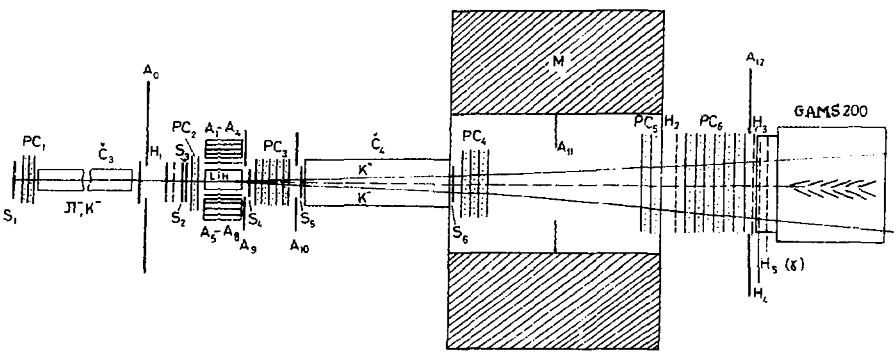

Fig. 1. Layout of the setup "Lepton-F".

Trigger T_A required the presence of π^--meson in the beam and a signal from the active converter, which corresponded to the appearance of at least one photon in the final state. Trigger T_B required additionally only a primary K^--meson in the beam.

During the runs the setup was also triggered by high energy muons in the beam (approximately once per accelerator cycle), and sometimes it was calibrated by photon pairs produced in the $\pi^- p \to \pi^0 (\eta) n$ reaction. In between the accelerator cycles the γ-spectrometer channels were tested by the pulses from the LED's and the pedestals were measured. The total number of triggering and calibrating events, recorded on the magnetic tapes during experiment was $4 \cdot 10^6$ and $2 \cdot 10^6$, respectively.

To select reactions (5) and (7) in the course of handling the information recorded on the tape we picked out the events, which in the final state had:

a) two tracks of positive and negative particles with momenta $p > 7.5$ GeV/c (i.e., above the threshold $P_0 = 6.8$ GeV/c for π-mesons in $\check{C}_4$);

b) two photons with $E_\gamma > 0.5$ GeV, $E_{\gamma_1} + E_{\gamma_2} > 5$ GeV. In the mass spectrum of $\gamma\gamma$-system the signal from π^0-meson is dominating. Therefore for the final selection of the events of (5) and (7) it was sufficient to use some more additional criteria $100 < m_{\gamma\gamma} < 180$ MeV/c^2 (π^0-meson production) and $29 < E_{K^+} + E_{K^-} + E_{\pi^0} < 35$ GeV (the particle total energy in the final state corresponds to the incident beam energy).

As a result ~ 5000 events for reaction (5) and ~ 600 for reaction (7) have been selected.

The mass spectrum of $K^+K^-\pi^0$-system in reaction (5) for $M(K^+K^-\pi^0) < 1400$ MeV is given in fig. 2. A peak corresponding to D(1285) meson can distinctly be seen in this spectrum. The mass distribution was fitted by the

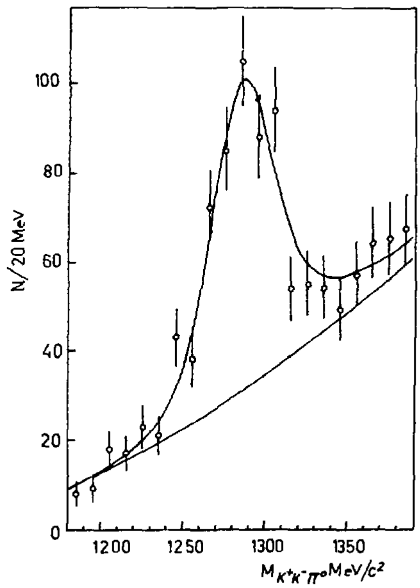

Fig. 2. Mass spectrum of $K^+K^-\pi^0$-system in the $\pi^- p \to K^+K^-\pi^0 + n$ reaction for $M_{K^+K^-\pi^0} < 1400$ MeV.

convolution of the Breit-Wigner relativistic formula with tabulated values for D-meson parameters (M=1283 MeV, Γ=26 MeV) and the setup apparatus function (Gauss distribution). The background under the resonance was described by a smooth curve with two free parameters. There are 400±50 events (with account for the systematic error) in the peak. To determine the cross section for reaction (2) normalization was carried out for the well investigated processes

$$\pi^- p \to \eta + n \quad (9)$$
$$\hookrightarrow \pi^+\pi^-\pi^0$$

$$\pi^- p \to \omega + n \quad (10)$$
$$\hookrightarrow \pi^+\pi^-\pi^0$$

This normalization method allows one to take into consideration the apparatus effects (track detector efficiency, accidental switches off in the guard system, photon absorption in the target, etc.) and also to define the effective number of protons in the nuclear target (LiH).

The cross section for reaction (2) was defined by formula

$$\sigma[\pi^- p \to D(1285)n] = \frac{N_D \cdot \varepsilon_n \cdot \sigma(\pi^- p \to \eta n) \cdot BR(\eta \to \pi^+\pi^-\pi^0)}{N_\eta \cdot \varepsilon_D \cdot BR(D \to K^+K^-\pi^0)},$$

where N_D, N_η is the number of detected events in reactions (2) and (9); ε_D and ε_η are Monte-Carlo calculated geometry efficiency of the setup in reactions (2) and (9) with account for the kinematic cuts. Whereof we obtain

$$\sigma(\pi^- p \to D(1285)n) = (4.3 \pm 1.7) \text{ mkb.} \quad (11)$$

The error in the cross section was mainly due to uncertainties in the tabulated values for the $BR(D \to K^+K^-\pi^0)$ and in the normalization procedure.

The following procedure was used to define the differential spectrum $dN/dm_{K^+K^-}$ in the decay $D \to K^+K^-\pi^0$. The total K^+K^- mass spectrum in reaction (5) was devided into 15 MeV intervals. A $K^+K^-\pi^0$-system spectrum was constructed for each of these intervals, and each spectrum was then analyzed so as to define the number of D-mesons in it.

The results for one of such spectra are given in fig. 3. The resonance parameters (M_D=1287 MeV; Γ_D= 46 MeV) were defined from the total $K^+K^-\pi^0$ spectrum (fig. 2) and were fixed for all distributions. The background under the peak was described by a smooth curve with two free parameters. As a result, with account for the setup efficiency we obtained the final spectrum for decay (4) (fig. 4). The setup resolution in $m_{K^+K^-}$ was ± 5 MeV/c^2 in the measured energy range.

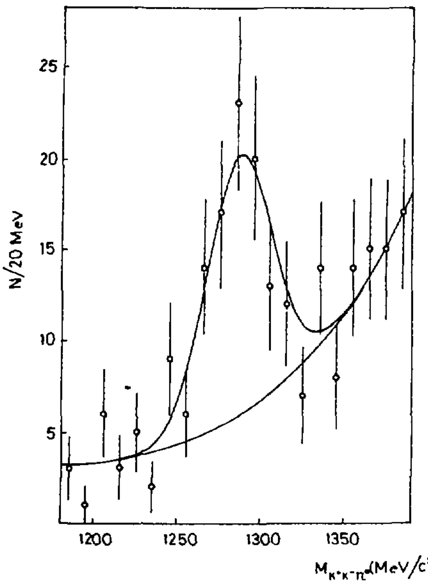

Fig. 3.

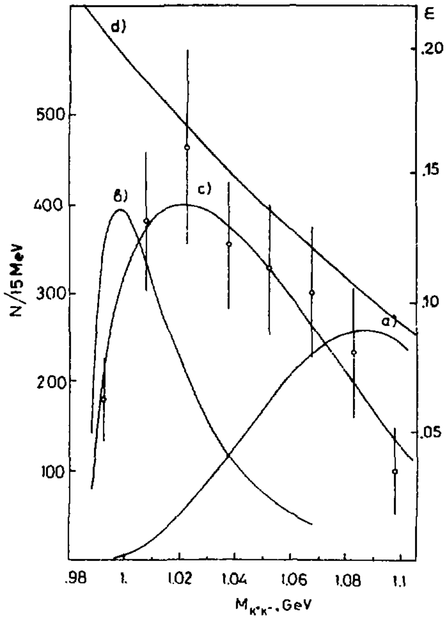

Fig. 4.

Fig. 3. Mass spectrum of $K^+K^-\pi^0$ system for $1000\ MeV/c^2 < m_{K^+K^-} < 1015\ MeV/c^2$.

Fig. 4. The curves are fits of the experimental data; a) the d-wave phase space according to eq. 12, b) formula (14) with the propagator in the form of a relativistic Breit-Wigner resonance with the parameters $M = 983\ MeV/c^2$, $\Gamma = 54\ MeV/c$. c) formula (14) with $D_\delta(s)$ from ref./10/.

Thus, the second experimental result, obtained in our paper is the differential spectrum for K^+K^- pair in the $D(1285) \to K^+K^-\pi^0$ system with statistics by an order of magnitude higher than the available data/8/.

Let us consider the quantum numbers of K^+K^- system in decay (4). The isotopic spin I=1, charge parity C is positive. Since C - parity conserves in the decay and C-parity of the K^+K^--system coincides with P-parity and is equal to $(-I)^J$ (J is the spin of the K^+K^--system), only even values of the spin $J^P = 0^{++}, 2^{++}, 4^{++}$, etc. are admissible. Moreover it is natural to expect that the d-wave and all higher waves to be suppressed because of small energy release.

To check this assumptions an attempt was made to describe the experimental spectrum of kaon pairs with the d-wave phase space (fig. 4)

$$dN/dm_{K^+K^-} \sim (p^*_{\pi^o})^3 \cdot (p^*_K)^5 \qquad (12)$$

where $p^*_{\pi^o}$ is the π^o momentum in the D-meson c.m.s., p^*_K is K-meson momentum in the dikaon system. The fit is quite evidently unsatisfactory (C.L. $\sim 10^{-11}$). Thus our assumption on the S-wave dominance is correct.

Thus, the quantum numbers of the K^+K^- system in decay (4) coincide with those of δ(980)-meson, and the pole of this resonance is on the phase space boundary of decay (4), i.e. the scalar δ(980) meson may give a considerable contribution to decay (4). In such a model decay (4) goes on as follows

$$D \to \delta\pi, \quad \delta \to K^+K^- \qquad (13)$$

and its differential spectrum is described by the formula

$$dN/dm_{K^+K^-} \sim (p^*_{\pi^o})^3 \cdot (p^*_K)/|D_\delta(s)|^2, \qquad (14)$$

where $D_\delta(s)$ is δ-meson propagator. It means, that if one can single out the contribution from (13) to decay (4) or if mechanism (13) dominates, then the $dN/dM_{K^+K^-}$-spectrum gives information about $D_\delta(s)$ propagator.

One more mechanism of decay (4) was considered in paper/3/. It is a background one in the case of δ-meson properties are studied. We are speaking about the contribution to (4) from the process with virtual $K^*(890)$ in the channel $K\pi$ ($K^*(890)$ that is the resonance of the K system, nearest to the phase space of decay (4)). The contribution from this mechanism was shown not to exceed 15% (in this we used limitations obtained for the mixing angle in the axial nonet $|\delta_A| < 13^o$, which will be discussed below). This result is a strong argument in favour of the fact that in (4) the dominating state is the intermediate $\delta\pi$ one, otherwise it would be quite a problem to explain the observed partial width of this decay.

Another argument is a high differential probability for the decay $D \to \delta\pi$ ($\delta \to \eta\pi$) (> 30%), i.e., the coupling constant $g^2_{D\delta\pi}$ is large. There are also experimental indications to a strong coupling of δ(980) with $K\bar{K}$ (since δ(980) is produced in the process $K^-p \to \delta(980)+\Sigma$ ($\delta \to \eta\pi$) with a large cross section).

The curve b) in fig. 4 is the result of fitting the spectrum with formula (14), which describes δ-meson contribution to decay (3). Here δ(980) is described as a relativistic Breit-Wigner resonance with the tabulated values of the width and mass. Quite evidently the fit is not satisfactory. It means that either the decay is described by some other, unknown mechanism, or that the description used for the δ-meson propagator is not correct. The second version seems to be more natural and it has been discussed in a number of papers[8-10]. Namely in these papers it was assumed for the first time, that the closeness of $K\bar{K}$ and $\eta\pi$ channels thresholds influenced the properties of δ-meson. Indeed Breit-Wigner relativistic formula is valid for the description of the propagators of narrow resonances being considerably higher than the thresholds of main channels. Exactly so was described the δ-resonance observed in the $\eta\pi$-mode[11]. The width for δ-meson obtained in this paper in such an approximation is Γ_δ = 54 MeV and this is the value that entered the Particle Data.

However the propagator for δ-meson is more complicated: the "effective" width of the resonance is strongly dependent on the invariant mass of the decay products, which is caused by the closeness of the pole to the threshold of one of the main channels (into $K\bar{K}$).

The data from paper[11] are described well enough by the contribution of δ-meson with compound propagators. Here the "real" width of δ above $K\bar{K}$ threshold may be large $\Gamma \sim 500$ MeV. Unfortunately it is impossible to make the choice in favour of the models either with a "narrow" or a "wide" δ-meson because of poor statistics in this paper.

A bright prediction made in[9-10] is the absence of a seeming "narrowness" of δ-meson in $K\bar{K}$ channel. However the analysis in this case is connected with great difficulties and requires rich statistics, since only a "tail" from this resonance is observed in this channel. That is why our work is the first one, which allows us to carry out such an analysis.

The curve c) in fig. 4 is a description of the spectrum by the contribution from the mechanism with $\delta(980)$ in the intermediate state with $D_\delta(s)$ from[10] with account for a strong coupling with $K\bar{K}$ channel. For the dynamical width of δ-meson at the point of $\sqrt{s}$ = 1 GeV/c^2 we have Γ_δ ($\sqrt{s}$ = 1) = $= -\mathrm{Im}D_\delta(s)/\sqrt{s} > 180$ MeV/c^2 (at 98% C.L.). Such a value of this parameter points to a strong coupling of δ-meson to hadrons and seems to withdraw the problem of "puzzling" δ-meson narrowness.

Fig. 5 presents the effective mass distribution for the $K^+K^-\pi^0$ system in the mass region >1350 MeV, weighted with the setup efficiency (we present here the weighted spectrum as the acceptance changes greatly in this mass range).

No statistically significant signals are observed in the region of E(1420) meson. The analysis of this distribution allows us to obtain the upper limit for the cross section of reaction (3), which turned out to be equal to

$$\sigma[\pi^- p \to E(1420)n] \cdot BR(E \to K^+K^-\pi^o) < 22 \text{ nb} \qquad (15)$$

(90% C.L.)

The procedure of defining the cross sections is similar to the one described above for D(1285) meson production. The $BR(E \to K^+K^-\pi^o) = 1/6 BR(E \to K\bar{K}\pi) \approx 0,10$ has been estimated in paper/12/.

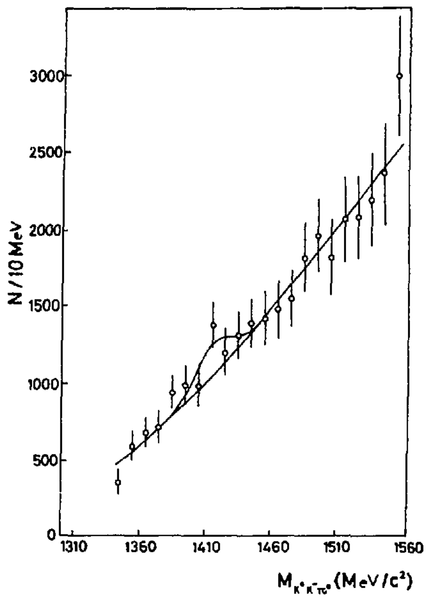

Fig. 5. Distribution over the $K^+K^-\pi^o$ invariant mass produced in the $\pi^- p \to K^+K^-\pi^o + n$ reaction, weighted with the setup efficiency for $M(K^+K^-\pi^o) > 1350$ MeV. The results of the fit were used to obtain the upper limit for E(1420) meson production cross section.

Using the estimate and quoted upper limit (15) we obtain

$$\frac{\sigma[\pi^- p \to E(1420)n]}{\sigma[\pi^- p \to D(1285)n]} < 0,05 \qquad (16)$$

From (16) one can derive limits for the mixing angle in the axial-vector meson nonet

$$tg^2\delta = \frac{\sigma[\pi^- p \to E(1420)n]}{\sigma[\pi^- p \to D(1285)n]} < 0,05, \quad |\delta| < 13^o. \qquad (17)$$

($\delta = 0$ corresponds to the ideal mixing). Qualitatively it means that E(1420) consists mainly of strange quarks and the production cross section for this meson in the $K^- p \to E(1420)Y$ reaction would be expected to be much larger than cross section (3).

Fig. 6 shows the mass spectrum $K^+K^-\pi^o$ system in process (7), weighted with the setup efficiency. In the mass spectrum there is a distinct peak corresponding to the E(1420) meson production (E meson in $K^- p$ interaction was observed in our experiment for the first time). A large value for the cross section ratio

$$\frac{\sigma[(K^-p \to E(1420)Y]}{\sigma[(\pi^-p \to E(1420)n]} > 10 \qquad (18)$$

confirms the quantitative conclusion on the E(1420) meson quark composition, which was made above.

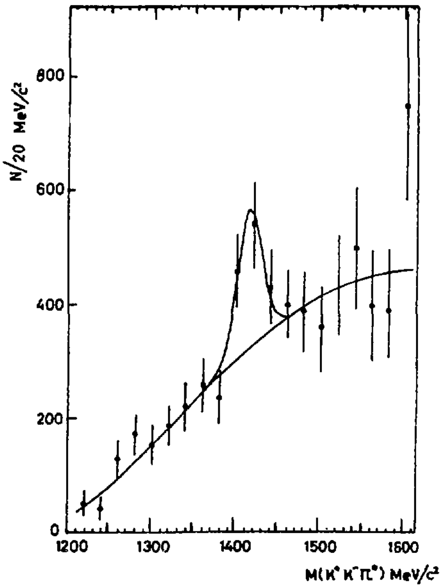

Fig. 6. Distribution over the $K^+K^-\pi^0$ invariant mass, produced in the $K^-p \to K^+K^-\pi^0+Y$ reaction, weighted with the setup efficiency. The peak corresponds to E(1420) meson production.

REFERENCE

1. Bitukov S.I., Viktorov V.A., Golovkin S.V. et al. - IHEP Preprint 83-203, Serpukhov, 1983; Yad. Phys., 1984, v. 39, p. 1165.
2. Bitukov S.I., Viktorov V.A., Golovkin S.V. et al. - IHEP Preprint 83-201, Serpukhov, 1983; Pizma v JETPh, 1984, v. 39, p. 96.
3. Kubarovsky V.P., Obraztsov V.F. - IHEP Preprint 84-53, Serpukhov, 1984.
4. Bushnin Yu.B., Viktorov V.A., Golovkin S.I. et al. - IHEP Preprint 80-57, Serpukhov, 1980.
5. Ayres D.S. et al. - Phys. Rev. Lett., 1975, v. 32, p. 1463; Apel W.D. et al. - Preprint CERN/EP/79-14, 1979.
6. Field J.H. Rapporteurs talk at the International Europhysics Conference on High Energy Physics, Brighton, 1983.
7. Binon F., Bricman K., Gouanere M. et al. - Nucl. Inst. Meth., 1981, v.188, p. 507.

8. Gorden M.J., Douwell V.D., Garvey Y. et al. - Nucl. Phys., 1978, v. B144, p. 253.
9. Flatte S.M. - Phys. Lett., 1976, v. 63B, p. 224, 228.
10. Achasov N.N., Devyanin S.A., Shestakov G.N. - IM Preprint TF-121, Novosibirsk, 1982; Phys. Lett., 1980, v. 96B, p. 168; 1980, v. 32, p. 1098; Phys. Lett., 1981, v. 102B, p. 196.
11. Gay Y.B., Chalouoka V., Gavillet Ph. et al. - Phys. Lett., 1976, v. 63B, p. 220.
12. Dionisi C., Gavilett P.H., Armenteros R. et al. - Nucl. Phys., 1980, v. B169, p. 1.

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