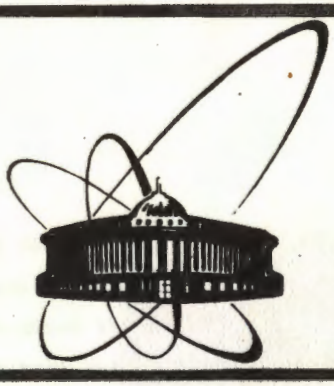

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DETERMINATION OF PARAMETERS OF DEUTERON SIX-QUARK COMPONENT

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1983

Our data[1] on the proton momentum spectra at zero angles in the relativistic (8.9 GeV/c) deuteron fragmentation on C and CH_2 targets were obtained at the Dubna synchrophasotron (see also[2]). From these data we have extracted[3] the nucleon momentum distribution in deuteron $|\Psi(K)|^2$ shown in fig.1 versus the relativistic analogue of the relative nucleon momentum K defined as $K^2=(m_N^2+p_\perp^2)/[4\alpha(1-\alpha)]-m_N^2$. Here α is a fraction of the deuteron momentum carried out by the proton in IMF. An excess, as large as 300%, of the measured $|\Psi(K)|^2$ value over the expected one from the two-nucleon deuteron wave functions (DWF) has been found in the high momentum region $0.2 < K < 0.6$ GeV/c. It cannot be explained by isospin-dependent effects of final-state interactions[3]. We explain[1] this excess (see fig.1) in the framework of a hybrid model of DWF[4]. It takes into account the two-nucleon (np) component and collective six-quark (6q) admixture described as an S^6-configuration in the oscillator quark model with three free parameters: the r.m.s. radius of 6q-state, the value of the 6q-admixture and the relative phase between np- and 6q-components. In estimating (table) their values by fit, data in the region $0.36 < K < 0.53$ GeV/c are omitted, because their excess over the calculation with our DWF is possibly due to the diffraction production of the dibaryon resonance[1]. Estimates[5] of the radius and the value of 6q-admixture made recently from NA4-experiment data on deep inelastic muon-carbon scattering are in agreement with ours. The $|\Psi(K)|^2$ was also extracted in the analysis[6] of deuteron electrodisintegration data of different groups which support (fig.2) our results.

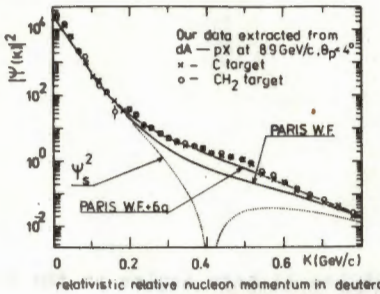

FIGURE 1.
Nucleon momentum distributions in deuteron obtained[3] from our data[1].

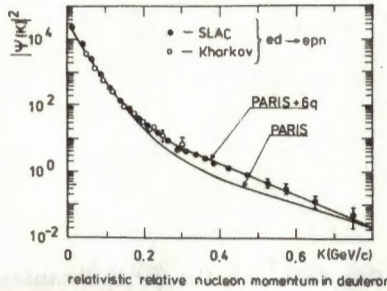

FIGURE 2.
Nucleon momentum distributions in deuteron from analysis[6].

Table. The hybrid model DWF parameters obtained from the fit of our data.

Target	Value of 6q admixture	r.m.s. radius of 6q system (fm)	relative phase of np- and 6q-component of DWF	X^2/degrees of freedom
CH_2	(10.8±1.2)%	0.99±0.04	95°±7°	1.6
C	(8.6±0.8)%	0.95±0.05	82°±6°	1.9

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Аблеев В.Г. и др. E1-83-487

Определение параметров шестикварковой компоненты дейтрона

Представлены экспериментальные результаты по импульсным распределениям нуклонов в дейтроне, извлеченные из наших данных по импульсным спектрам протонов, вылетающих под нулевым углом при фрагментации релятивистских дейтронов (8,9 ГэВ/с) на C и CH_2 мишенях. Полученные импульсные распределения хорошо описываются в рамках гибридной модели дейтрона, которая включает коллективное шестикварковое состояние. Приводятся оценки параметров шестикваркового состояния, полученные из подгонки к экспериментальным данным. Анализ данных экспериментов по глубоконеупругому рассеянию электронов (СЛАК) и мюонов (НА4) подтверждает наши результаты.

Работа выполнена в Лаборатории высоких энергий ОИЯИ.

Препринт Объединенного института ядерных исследований. Дубна 1983

Ableev V.G. et al. E1-83-487

Determination of Parameters of Deuteron Six-Quark Component

We present experimental results for the nucleon momentum distributions in deuteron extracted from our data for the momentum spectra of protons emitted at zero angles in the relativistic (8.9 GeV/c) deuteron fragmentation on C and CH_2 targets. The momentum distributions obtained are well described in the framework of a hybrid model of the deuteron which includes the collective six-quark-state. The six-quark-state parameters are estimated from the fit to experimental data. The analysis of the experimental data on deep inelastic electron (SLAC) and muon (NA4) scattering supports our results.

The investigation has been performed at the Laboratory of High Energies, JINR.

Preprint of the Joint Institute for Nuclear Research. Dubna 1983