SEARCH FOR NARROW DIBARYON RESONANCES IN DEUTERON BREAK-UP REACTION $pd \to ppn$ AT 1 GeV IN COMPLETE KINEMATICS EXPERIMENT

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The investigation of the deuteron break-up reaction $pd \to p_1 p_2 n_3$ was gone on to search for the dibaryon resonance ($m_R \approx 2.15\ GeV$, $\Gamma = 22\ MeV$) in the pn-system, using the two-arm coincidence technique which has been described in the previous report [1].

The forward fast proton "p_1" from the reaction has been detected at the angle $\Theta_1 = 15^0$ by the magnetic spectrometer with the momentum resolution $\Delta p_1/p_1 = 10^{-2}$ (FWHM), which corresponds to the missing mass resolution of the $p_2 n_3$-system 10 MeV (FWHM) in the mass range near 2.15 *GeV*. The recoil proton "p_2" coming both from the deuteron break-up reaction $pd \to p_1 p_2 n_3$ and eventual dibaryon decay ($pd \to p_1 R$, $R \to p_2 n_3$) has been registered with a large acceptance time-of-flight scintillation spectrometer at the angle $\Theta_2 = 78^0$ (in the previous run the recoil angle Θ_2 was equal to 115^0).

The same criteria (the magnetic analysis, the time-of-flight, energy loss in the scintillators of the time-of-flight spectrometer) have been used for separating the true events from those due to the pion production background reactions and the random coincidences.

The p_1-momentum range has been investigated from 1.190 *GeV/c* to 1.440 *GeV/c* corresponding to the missing mass range from 2.04 *GeV* to 2.22 *GeV*.

The experimental p_1-momentum spectrum does not display any evidence for the narrow dibaryon resonances. The estimations of the upper limit of the total cross section of the dibaryon production were performed like in ref. [1]. The table shows the quantum numbers of the resonance and the $p_2 n_3$-system, the magnetic quantum numbers of the resonance, the angular distributions of its decay products in its rest frame and the upper limits of the total cross section of the debaryon ($m_R = 2.15\ GeV$, $\Gamma = 22\ MeV$) production for the first and second runs. The resonance was supposed to be aligned totally ($|M| = 0, 1$ or 2).

In conclusion our recearch does not confirm the existence of the resonance in the mass range from 2.04 to 2.22 *GeV*. The upper limit of the resonance production ($m_R = 2.15\ GeV$, $\Gamma = 22\ MeV$) does not exceed 15 μb, if its spin at least $J \leq 2$.

τ^p	$^{2s+1}L_\tau$	| M |	Angular distribution of decay proton	$\sigma_1, \mu b$	$\sigma_2, \mu b$
0^+	$^1S_0$	0	const	5	8
0^-	$^3P_0$	0	const	5	8
	$^3S_1$	0	const	5	8
		1			
1^+	$^3D_1$	0	$\sin^2\Theta\cdot\cos^2\Theta + 1/9(3\cos^2\Theta - 1)^2$	7	11
		1	$1/2\sin^4\Theta + \sin^2\Theta\cdot\cos^2\Theta + 1/18(3\cos^2\Theta - 1)^2$	4	8
	$^1P_1$	0	$\cos^2\Theta$	13	14
1^-		1	$\sin^2\Theta$	4	7
	$^3P_1$	0	$\sin^2\Theta$	4	7
		1	$1 + \cos^2\Theta$	6	9
	$^1D_2$	0	$(3\cos^2\Theta - 1)^2$	9	50
2^+		1	$\sin^2\Theta\cdot\cos^2\Theta$	6	7
	$^3D_2$		$\sin^2\Theta\cdot\cos^3\Theta$	6	7
		1	$1/2\sin^4\Theta + \sin^2\Theta\cdot\cos^2\Theta + 1/2(3\cos^2\Theta - 1)^2$	5	12
2^-	$^3P_2$	0	$1 + 3\cos^2\Theta$	7	11
		1	$1 + \cos^2\Theta$	6	9

Reference

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