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Resonance mechanism of the reaction $pd \to pd\pi\pi$ in the GeV region

At present as one of the most realistic candidate to dibaryon resonance
is considered the resonance $D_{IJ} = D_{03}$ observed by the WASA@COSY [1]
in the total cross
section of the reaction of two-pion production
$pn \to d\pi^0\pi^0$, here I is the isospin and J is the total angular momentum of this
resonance.
Very similar resonance structure was observed by ANKE@COSY in
the differential cross section
of the two-pion production reaction $pd \to pd\pi\pi$ at beam energies 0.8-2.0~GeV
with high transferred momentum to the deuteron at small scattering angles
of the final proton and deuteron [2].
In the distribution over the invariant mass $M_{d\pi\pi}$ of the final $d\pi\pi$ system
the resonance peaks
were observed at $M_{d\pi\pi} \approx 2.38$~GeV [2]
that is the
mass of the isoscalar two-baryon resonance $D_{IJ} = D_{03}$,
while the kinematic conditions differ considerably from that in Ref. [1].
This data we analyzed in Ref. [3]
assuming
excitation of the D_{03} resonance via t-channel σ-meson
exchange between the proton and deuteron and using
the two-resonance mechanism of the D_{03} resonance decay [4].
The shapes of the distributions over the invariant masses
of the final $d\pi\pi$ and $\pi\pi$ systems were explained qualitatively in [3]
assuming the lowest values of the orbital angular momenta in the vertices $\sigma d \to D_{03}$ ($L = 2$),
$D_{03} \to D_{12} + \pi$ ($l_1 = 1$), $D_{12} \to d + \pi$ ($l_2 = 1$).
In this work we study the role of higher orbital momenta in those vertices ($L = 2, 4,\ l_1 = 1, 3, 5,\ l_2 = 1, 3$).
Furthermore, a possible contribution of the D_{03} excitation to the pd-backward
elastic scattering is studied in the 1 GeV region.

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Author: Prof. UZIKOV, Yury (Joint Institute for Nuclear Researches)

Co-author: Mr TURSUNBAYEV, Nurbek (JINR, DLNP)

Presenter: Prof. UZIKOV, Yury (Joint Institute for Nuclear Researches)