

Status of the Dibaryon Resonance $d^*(2380)$ *)

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The dibaryon resonance $d(2380)$ with $I(JP) = 0(3+)$ – first observed in the double-pionic fusion to the deuteron [1] – has meanwhile been detected in all relevant two-pion production channels in incident neutron-proton collisions [2]. In addition, its resonance pole has been revealed in neutron-proton scattering [3].

Theoretical calculations describe this state either as a compact hexaquark [4] or a dilute molecular-like object [5]. Whereas the d decay into two-pion channels does not discriminate between these two scenarios, the decay into single-pion channels is very discriminatory. In the hexaquark case this decay is heavily suppressed with a branching less than 1% [4]. In the molecular-like case a branching of as much as 18% is expected.

In order to clarify this situation we have measured the isoscalar single-pion production in the energy region of $d^*(2380)$. As a result we find no evidence for such a decay with an upper limit of smaller than 9%. This is in support of the hexaquark interpretation – at least as the dominant configuration, possibly surrounded by a cloud of molecular-like configurations [6].

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