THEORETICAL DESCRIPTION OF SCATTERING IN 3*N* SYSTEM WITH ACCOUNT OF DIBARYON CHANNELS AND 3*N* FORCES

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Faddeev equations (FE) describe excellently the scattering processes in 3*N* systems at low energies. However, at higher energies the standard FE technique faces a number of problems. For example, the results of rigorous Faddeev calculations for *N*d scattering begin to deviate substantially from experimental data already at $E_{lab} \approx 150$ MeV. Although the inclusion of three-body forces is obviously necessary at such energies, the account of conventional 3*N* forces (emerging from the intermediate Δ-isobar production via two-pion exchange) does not help remove the observed discrepancies.

On the other hand, at higher energies we deal with the shorter *NN* distances where quark degrees of freedom (d.o.f.) should be manifest. In the dibaryon model proposed by the Moscow–Tuebingen group quark d.o.f. are taken into account through the formation of an intermediate 6*q* bag dressed by a strong scalar field. In contrast to the conventional meson-exchange potentials, which describe the *NN* scattering up to 350 MeV lab energy only, in the dibaryon model the empirical *NN* phase shifts were fitted in the energy interval 0-1000 MeV. Furthermore, the above mechanism of the short-range *NN* interaction leads to the emergence of new types of three-body forces. The ground states of ^{3}H and ^{3}He nuclei were described in this model very well [1], but the 3*N* scattering problem was not rigorously considered in the dibaryon model before (the only qualitative results for pd elastic scattering were presented in [2]).

We modified the standard FE for 3*N* system by incorporating the "internal" (dibaryon) channels and also by taking into account the new three-body forces which emerge from the dibaryon mechanism. The resulted equations may be written and solved in a multichannel formulation or, alternatively, in the 3*N* channel only, after exclusion of the dibaryon d.o.f. In the latter case we have the standard FE which however contain the non-conventional energy-dependent effective interactions. The first iterations of the modified equations give the leading mechanisms (with proper relative phases) for 3*N*-scattering processes at higher energies (~ 1 GeV). Some examples of such mechanisms for *N*d scattering will be given in the talk.

1. V.I.Kukulin, V.N.Pomerantsev, M.Kaskulov, A.Faessler // J. Phys. G. 2004. V.30. P.287.
2. M.N.Platonova, V.I.Kukulin // J. Phys. Conf. Ser. 2012. V.381. 012110.