STUDY OF LIGHT NUCLEI CLUSTER STRUCTURE WITH NUCLEAR TRACK EMULSION

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Thanks to its record spatial resolution and sensitivity, the method of nuclear track emulsions (NTE) allowed carrying out a "tomography" for a whole family of light nuclei, including neutron deficient ones[1,2,3]. In the case of peripheral interactions a relativistic scale of collisions of nuclei not only does not impede investigation of the cluster aspects of nuclear structure, but also offers advantages for studying few-particle ensembles. The facts collected in "mosaic" in these notes can serve as experimental "lighthouses" for developing theoretical concepts of nuclear clustering as well as for planning new experimental studies with relativistic nuclei.

In general, the presented results confirm the hypothesis that the known features of light nuclei define the pattern of their relativistic dissociation. The probability distributions of the final configuration of fragments allow their contributions to the structure of the investigated nuclei to be evaluated. These distributions have an individual character for each of the presented nuclei appearing as their original "autograph". The nuclei themselves are presented as various superpositions of light nuclei-cores, the lightest nuclei-clusters and nucleons. Therefore, the selection of any single or even a pair of configurations would be a simplification determined by the intention to understand the major aspects of nuclear reactions and nuclear properties rather than the real situation. The data presented are intended to help estimate the degree and effects of such simplifications.

In the energy range of nuclei several MeV per nucleon, there is a possibility of implantation of radioactive nuclei into detector material. Of course, in this approach daughter nuclei are investigated rather than the nuclei themselves. In this respect it is worth mentioning the known, although somewhat forgotten, possibilities of NTE for the detection of slow radioactive nuclei, and its properties.

The report presents the results for the ^{7,8,9} Be, ^{9,10,12} C interacting with the nuclei of NTE.

[1] The BECQUEREL Project, http://becquerel.jinr.ru/

[2] D. A. Artemenkov et al., Few Body Syst. 50, 259 (2011); arXiv:1105.2374

[3] D. A. Artemenkov et al., Few Body Syst. 44, 273 (2008)

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