Contribution ID: **174** Type: **not specified**

IS THE STATE E*=14.08 MeV OF 12C NUCLEUS OBSERVED IN THE p-TRANSFER PROCESSES?

The problem of generating a 12C nucleus in the universe is extremely important, since it is the starting point in the chains of further stellar nucleosynthesis, and plays a huge role in evolution as a whole. It is generally accepted that the 12C nucleus is formed mainly by fusion of three α particles, 3α⟶12C* or 8B+ α through the Hoyle state (0+) with an excitation energy of 7.65 MeV, which is the subject of a colossal number of publications.

However, the alternative pathways of its formation considered, for example, in the inhomogeneous Big Bang model [1,2] leading to radiative capture of a proton by the 11B nucleus, cannot be ignored. For its assessment, the structure of all proton-bound states of the 12C nucleus, into which proton capture can occur, is extremely important. But, oddly enough, even the systematics of the energy spectrum of this nucleus has not yet been clarified. In reactions with proton transfer, the systematics of single-particle levels seems to be most adequately reflected in the work of Reynolds in [3] where the spectra of deuterons from the 11B(3He,d) reaction were studied with high energy resolution.

Section

Nuclear physics (Section 1)

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Track Classification: The V International Scientific Forum "Nuclear Science and Technologies": Nuclear physics (Section 1)