

EXPOSURE OF NUCLEAR TRACK EMULSION TO ULTRARELATIVISTIC μ -MESONS

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Search for effects that are critical for the interpretation of the phenomenon of multiple fragmentation of nuclei can be complemented by exposure of nuclear track emulsion (NTE) to ultrarelativistic μ -mesons. Despite the widespread use of NTE, such an exposure appeared to be missed. In 2012 NTE was exposed at CERN to halo of a beam of μ -mesons with an energy of 160 GeV. When viewing about 300 stars produced in NTE were found with the number of target fragments of at least three (example in Fig. 1). Topology of stars is determined by the number strongly ionizing b - and g -particles (N_b and N_g). In 23 events the total number of tracks N_b and N_g (N_h) was not less than 12. Despite the limitations of solid angle in which tracks can be observed, one can conclude about facts of the formation of stars with high multiplicity, up to about half of the charge of heavy nuclei from the NTE. These preliminary observations suggest to be promising a full investigation of complete destruction of nuclei by m -mesons based on multilayer assemblies of thick layers of NTE. Among the stars significant contribution of events found that could be associated with the break-up $^{12}\text{C} \rightarrow 3\alpha$ ($N_b = 3$, $N_g = 0$) having the lowest threshold. Certainty in their interpretation on the basis of ranges of α -particles and their spatial angles of formation allows one to evaluate the nature of interaction.

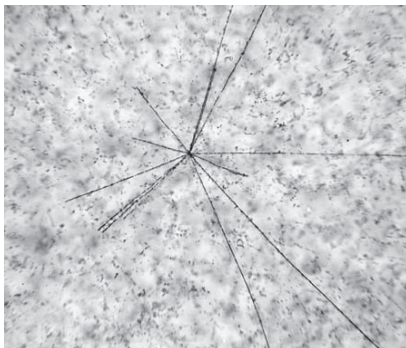


Fig. 1. Macrophotography of a star induced by a μ -meson in it transversely exposed NTE.