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Source velocity at relativistic beams of ^{4}He

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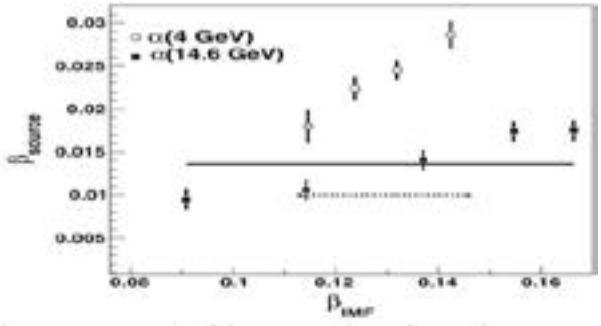
The main decay mode of very excited nuclei (E*≥4 MeV/nucleon) is copious emission of intermediate mass fragments (IMF), which are heavier than α-particles but lighter than fission fragments. An effective way to produce hot nuclei is reactions induced by heavy ions with energies up to hundreds of MeV per nucleon. But in this case the heating of the nuclei may be accompanied by compression, rotation, and shape distortion, which can essentially influence the decay properties of hot nuclei. The picture becomes clearer when light relativistic projectiles are used. In this case, fragments are emitted by only one source - the slowly moving target spectator. Its excitation energy is almost entirely thermal. Light relativistic projectiles provide therefore a unique possibility for investigating thermal multifragmentation. The decay properties of hot nuclei are well described by statistical models of multifragmentation and this can be considered as an indication that the system is in thermal equilibrium or at least close to that. In the present work the source characteristics of multifragmentation are investigated for the ^{4}*He*+*Au* collisions at 4 and 14.6 GeV using the 4π FASA detector on Dubna superconducting accelerator Nuclotron. Evidence that at least kinetic equilibrium of the system is achieved before fragmentation take place is found in the results of rapidity analyses. Decrease in energy of the incident particles from 14.6 GeV to 4 GeV leads to increases momentum transfer and source velocities. Data in ^{4}*He* (14.6 GeV)+*Au* reaction are consistent with the INC+SMM calculations and can be described by one source with fixed velocity. There is broad range source velocities distribution in case of ^{4}*He* (4 GeV)+*Au* where the speed of the source increases with IMF energy that is not predicted by INC+SMM.



Biography

S P Avdeyev has his expertise in Nuclear Physics. He has completed his PhD from Joint Institute for Nuclear Research and Doctor of Science (Phys. and Math.) in 2007. He is a Research Team Leader focusing on nuclear multifragmentation at Joint Institute for Nuclear Research.

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