

New Pathways for Producing Heavy Exotic Nuclei

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Heavy exotic nuclei are usually produced in fragmentation reactions at relativistic energies or in complete fusion reactions at Coulomb barrier energies. Fragmentation allows to reach nuclei up to $Z = 92$ because uranium is the heaviest available projectile nucleus. To enter the transuranium region, fusion reactions are applied which, however, lead to relatively neutron-deficient isotopes due to the bending of the stability line toward the neutron axis. This causes the necessity for novel synthesis methods. Two possible options are presently discussed. These are multinucleon transfer reactions and fusion reactions with radioactive ion beams. Here, the feasibility of both methods will be illuminated from scientific and technical point of view.