

Simulated and experimental characteristics of a gas-filled recoil separator DGFRS-II

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For further physical and chemical studies of superheavy elements (SHEs), SHE Factory was constructed at FLNR JINR. The facility is based on a new DC-280 heavy-ion accelerator that can deliver ^{48}Ca beams with a projected intensity of $6 \cdot 10^{13}$ ions per second. The first experimental setup of the SHE Factory is a gas-filled recoil separator DGFRS-2 with a QvDhQhQvD magnet configuration. A model of the DGFRS-2 was created using a GEANT4 toolkit. The main methods of trajectory simulations of heavy ions in gaseous media are presented:

Forming of a compound nucleus in the target layer.

Evaporation of several neutrons from an excited nucleus.

Modeling of multiple scattering of ERs in the target and other separator's media (filling gas, a Mylar window between the separator and detector volumes, pentane in the detector chamber).

Calculation of energy losses in the target and gaseous media.

Modeling of an ERs recharge process in gas.

Calculation of recoil trajectory in the magnetic fields of the separator.

The calculated data agreed well with the experimental data generated in test experiments.

The speaker is a student or young scientist

Yes

Section

1. Experimental and theoretical studies of nuclear reactions

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