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Synthesis of heavy and superheavy neutron-rich nuclei in multinucleon transfer reactions at grazing angle using Uranium beams

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Information on the heaviest elements have been obtained up to now via fusion evaporation reactions. It is however well known that the only nuclei one can reach using fusion-evaporation reactions are neutron deficient and moreover in a very limited number (because of the limited number of beam-target combinations). An alternative to fusion-evaporation could be deep-inelastic collisions. Indeed, theoretical calculations predict large cross-sections for neutron-rich heavy elements production close to zero degrees and at grazing angles. We have recently performed an experiment at Argonne National Laboratory where MNT reactions experiment at zero using a 136Xe beam on a 238U targets. The promising preliminary results.
The goal of this proposal is to investigate deep inelastic reactions mechanisms in the heavy elements'region using the AGATA germanium array and DANTE detector coupled to PRISMA separator. We thus propose to study the multinucleon transfer reaction using a 238U beam on a 64Ni target angles at 40% above the Coulomb. Such an experiment would pave the way for future synthesis on the synthesis of new superheavy neutron-rich isotopes.

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