

## Quest for toroidal hyperheavy nuclei

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The existence of nuclei with exotic shapes was first suggested by H.A.Wilson and J.A.Wheeler. This idea was subsequently investigated by many authors. Recently analyses done in the framework of the Hartree-Fock-Bogoliubov theory and extended Thomas-Fermi method showed that for nuclei with  $Z > 140$  the global energy minimum correspond to toroidal shapes. This means that potentially synthesis of such light exotic nuclei is possible in collisions of stable nuclei.

To address this issue we have performed simulations of the formation and decay processes of such nuclei. We also simulate the process of the detection of decay fragments using the CHIMERA multidetector system. Our dynamical calculations done with the BUU code for Au + Au collisions indicate the threshold energy for toroidal nuclei formation is located around 23 MeV/nucleon. The decay process of such exotic nuclear systems is studied using the ETNA code. In order to disentangle between different shapes of exotic nuclear configurations three novel global variables have been introduced.

Performed analysis allows to find the region in the space defined by these three variables in which events corresponding to toroidal shape are enhanced relative to events corresponding to ball or bubble configurations.