

## Investigating the possible existence of hyper-heavy nuclei in a neutron-star environment\*

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The synthesis of hyper-heavy elements is investigated under conditions simulating neutron star environment. The constrained molecular dynamics approach is used to simulate low energy collisions of extremely n-rich nuclei. A new type of the fusion barrier due to a “neutron wind” is observed when the effect of neutron star environment (screening of Coulomb interaction) is introduced implicitly. When introducing also a background of surrounding nuclei, the nuclear fusion becomes possible down to temperatures of  $10^8$  K and synthesis of extremely heavy and n-rich nuclei appears feasible. A possible existence of hyper-heavy nuclei in a neutron star environment could provide a mechanism of extra coherent neutrino scattering or an additional mechanism, resulting in x-ray burst or a gravitational wave signal and, thus, becoming another crucial process adding new information to the suggested models on neutron star evolution.

\* This work is supported by the Czech Science Foundation (GACR Contract No. 21-24281S). A.B. research was funded in part by the United States Department of Energy under Grant No. DE-FG03-93ER40773 and the NNSA Grant No. DENA0003841 (CENTAUR). The simulations were performed at the Supercomputing facility of Czech Technical University in Prague.

[1] M. Veselský, V. Petousis, Ch. C. Moustakidis, G. A. Souliotis, and A. Bonasera, *Phys. Rev. C* **106**, L012802 (2022).