Contribution ID: **186** Type: **Oral talk (15 min + 5 min questions)**

Ab initio calculations of branching ratios of alpha particles, neutrons and protons in the decay of excited states of beryllium isotopes.

Friday, 15 July 2022 10:20 (20 minutes)

The modern theory of the structure of light nuclei is actively developing due to the introduction of ab initio (from first principles) methods of describing nuclear systems. An essential place among such methods is occupied by various versions of No-Core Shell Model (NCSM) (see, for example, [1]) that uses huge multi-nucleon bases and realistic NN potentials to describe the interaction of nucleons. Usually, these potentials are derived from Chiral Effective Field Theory. The discussed approach makes it possible to successfully describe the spectra of nuclei up to masses A ˜ 16 in a wide range of energies.
In the literature, there are also several successful attempts to describe the total widths of the nucleon and cluster decay of nuclear states [2,3]. In our works (see Ref. [4] and Refs. therein), we developed a method that makes it possible to solve the problem of multichannel decay of nuclei and calculate the partial widths of decay into a variety of channels. The subsequent publication [5] demonstrates the efficiency of the method for unstable nuclei.
The current report presents the results of a study of the decay properties of highly excited states of beryllium isotopes. Such a detailed calculation of the spectral characteristics of these nuclei – level energies, total decay widths and branching ratios of decays into radically different channels in a wide energy range has been carried out for the first time. A large list of predictions is given.

1. Dytrych T., Sviratcheva K. D., Bahri C., Draayer J. P., and Vary J. P., Phys. Rev. C 76, 014315 (2007).
2. Quaglioni S., and Navratil P., Phys. Rev. C 79 044606 (2009).
3. Neff T., Phys. Rev. Lett. 106 042502 (2011).
4. Rodkin D. M., Tchuvil'sky Yu. M., Phys. Rev. C 103, 024304.
5. Rodkin D. M., Tchuvil'sky Yu. M., Phys. Rev. C 104, 044323.

The speaker is a student or young scientist

No

Section

1. Nuclear structure: theory and experiment

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