

## Periodical System of Isotopes

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**Abstract :** With the help of a special algorithm being the principle of multilevel periodicity, the periodic change of properties at the nuclear level of chemical elements was discovered and the variant for the periodic system of isotopes was presented. The periodic change in the properties of isotopes, as well as the vertical symmetry of subgroups, was checked for consistency in accordance with the following ten types of experimental data: mass ratio of fission fragments; quadrupole moment values; magnetic moment; lifetime of radioactive isotopes; neutron scattering; thermal neutron radiative capture cross-sections ( $n, \gamma$ );  $\alpha$ -particle yield cross-sections ( $n, \alpha$ ); isotope abundance on Earth, in the Solar system and other stellar systems; features of ore formation and stellar evolution. For all ten cases, the correspondences for the proposed periodic structure of the nucleus were obtained. The system was formed in the usual 2D table, similar to the periodic system of elements, and the mass series of isotopes was divided into 8 periods and 4 types of 'nuclear' orbitals: sn, dn, pn, fn. The origin of 'magic' numbers as a set of filled charge shells of the nucleus was explained. Due to the isotope system, the periodic structure is shown at a new level of the universe, and the prospects of its practical use are opened up.

**Keywords :** periodic system, isotope, period, subgroup, "nuclear" orbital, nuclear reaction

**Conference Title :** ICNP 2025 : International Conference on Nuclear Physics

**Conference Location :** Cancun, Mexico

**Conference Dates :** April 03-04, 2025