

## PROJECT ON RESEARCH OF NUCLEAR DD-SYNTHESIS WITH POLARISATION OF INITIAL PARTICLES AT LOW ENERGIES (POLFUSION)

*Tuesday, 5 September 2023 15:20 (20 minutes)*

The nuclear dd-fusion reaction can proceed by three possible channels:  $3\text{H} + \text{p}$  ( $\approx 50\%$ );  $3\text{He} + \text{n}$  ( $\approx 50\%$ );  $4\text{He} + \gamma$  ( $\approx 10\text{-}7\%$ ).

Interest in dd - fusion has been aroused by both fundamental research and astrophysics [1] and applied science, particularly in the field of fusion reactor development [2]. In 1967-1968 at the Kurchatov Institute, the idea of studying the nuclear dd - fusion reaction using polarised deuteron beams was proposed [3]. The development of this idea was continued in the PolFusion (Polarised Fusion) nuclear physics experiment.

The PolFusion nuclear physics experiment aims to study the reaction of nuclear dd-synthesis with polarized source particles in the low energy region. The experiment is planned to measure the scattering asymmetries of dd-synthesis reaction products in the final state at different mutual orientation of the spins of colliding deuterons in the energy range 10-100 keV.

The authors will present an overview of the status of the experiment.

1. Bednyakov V.A. On the Origin of Chemical Elements, Physics of Elementary Particles and Atomic Nucleus, 2002, Vol. 33, No. 4, P. 915-690.
2. Casey D. T. et al. Thermonuclear reactions probed at stellar-core conditions with laser-based inertial-confinement fusion, Nature Phys., 2017, Vol. 13. Is-sue 12, P. 1227-1231.
3. Adjasevich B., Antonenko V. Measurements of the polarization correlation coefficients in reactions  $\text{d}(\text{d}, \text{p})\text{t}$  and  $\text{d}(\text{d}, \text{n})\text{3He}$ , Preprint IEA-2704, Moscow, 1976.

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