Cavitation collapse of bubbles filled with gas of hydrogen isotopes in water

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Until now, the question of the attainability of conditions for the implementation of fusion reactions of light nuclei during ultrasonic or laser cavitation remains unclear [1]. The low-background conditions of the Baksan Neutrino Observatory make it possible to measure ultra-low neutron fluxes in the $d + d \rightarrow 3He + n$ reaction, as well as the residual activity of tritium synthesized in the $d + d \rightarrow t + p$ channel. Tritium will decay according to the $3H \rightarrow 3He + \tilde{\nu}$ scheme with a period of 12.32 years, which makes it possible to register single acts of beta decay on low-background installations. An experimental setup for ultrasonic and laser generation of bubbles in deuterated liquids with the ability to measure light, sound and neutron yields is presented. Preliminary experimental results on the dynamics of the collapse of bubbles filled with argon in distilled water are analyzed. The interpretation of the experiment was carried out within the framework of the generalized Rayleigh-Plesset model [2].

[1] Nigmatulin R, Lahey R and Taleyarkhan R 2014 *Phys. Usp.* **184** 947–960
[2] Plesset M S 1982 *Journal of Applied Mechanics* **16** 277–282