FIRST SINGLE BUBBLE SONOLUMINESCENCE IN DUBNA.

V.B. Belyaev^{*}, M.B. Miller^{**}, A.V. Sermyagin^{**}

*Osaka University, Mihogaoko 10–1, Ibaraki Osaka 567, Japan; (on leave of Joint Institute for Nuclear Research, Dubna, Russia); *belyaev@miho.rcnp.osaka-u.ac.jp*; **Institute in Physical–Technical Problems, 141980 POB 39, Dubna, Moscow region, Russia; *sermyagin@vxjinr.jinr.ru*

At the Institute in Physical–Technical Problems experiments on sonoluminescence was started by our group at the beginning of this year. Our study was focused at properties of the single bubble mode of sonoluminescence. First experiments have already taken us, as it seems, to claiming-attention results. In particular, we managed to manipulate the process, varying boundary conditions on resonator outer surface. Some kind of interaction of a few spaced bubbles was observed, enhancing light emission by all of them simultaneously. Now we try to specify this effect ("few bubble sonoluminescence" – FBSL) and use it to affect conditions within the bubble, and study it further. Besides, conditions to induce SBSL in the spherical resonator with very low acoustical quality factor Q were discovered. This result, somehow unexpected, also attracted our attention. In such conditions stable SBSL can easy be supported during long-time runs. The system turns out to be practically non-sensitive to changes in external environment. The above and some other results are presented in the report. Besides, experiments in a stage of preparation are discussed, – a study of mechanism of "Argon rectification" within the bubble under SBSL, measurement of statistical moments of light flash intensity distribution, experiments on Einstein–Podolsky–Rosen correlations, as well as experiments on nuclear aspects in sonoluminescence. The last direction of studies is related, in particular, to a possibility of "molecular-nuclear synthesis" reactions in water under certain conditions, much discussed recently [1].

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References

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