CV

Levin Anatoliy

Date of birth: 24th January 1979
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Education
Energy System Institute, Ph.D. in Engineering (2006–2008)
Irkutsk National Research Technical University, School of Power Engineering, Master's degree (1997-2001)

Work experience
Head of Laboratory (2015-present), Senior Researcher (2008-2015), Leading Engineer (2000-2008) Melentiev Energy Systems Institute, Irkutsk, Russia
Associate Professor (2019–present) Irkutsk National Research Technical University, Irkutsk, Russia
Senior Researcher (2018-present) Novosibirsk State University, Novosibirsk, Russia

Representative achievements and major achievements
Significant results were obtained in the field of studies of the unsteady boiling crisis in an unheated liquid at large surges of heat load, accompanied by different rates (10 ÷ 9000 K/s) of heating of the heat-transferring surface. The experiments are carried out in a wide range of changes in pressure, initial temperature of liquids, flow rates in narrow channels (1-5 mm). Various cases of the internal geometry of the working areas from channels, annular tubes to porous media are covered.

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The studies were focused on characteristics of an unsteady heat transfer crisis, including the dynamics of vapor content, formation and growth of the vapor phase (bubbles, bubble conglomerates, vapor films, vapor cavities), the cyclical nature of the surface wetting process, the relationship between the structure of the near-wall vapor-liquid medium and heat transfer modes, the form of wettability recovery on the wall, the lifetime of vapor formations in a stream of unheated liquid, hydrodynamic effects and their relationship with heat and mass transfer processes and in the channel, the influence of the geometry of the flowing part on the studied phenomena. The main results obtained in this area include the following:

- The boundary of transition from the microbubble boiling front to the evaporation front during unsteady boiling of ethanol on a cylindrical surface was experimentally determined;
- Durations of time periods for the onset of intense vaporization (induction time) under the free convection for a wide range of operating conditions were determined and generalized;
- Existence conditions for the mode of super-intense boiling of an overheated liquid under the developed self-oscillations were revealed;
- Characteristics of unsteady nucleate boiling under conditions of unsteady heat release were experimentally determined. The inconsistency of existing analytical models for the bubble growth dynamics under similar conditions was revealed and an approach based on a numerical determination of the overheated liquid layer thickness was proposed.

The outcomes obtained in the field of numerical modeling were developed for the following processes:

- thermochemical conversion, to build a promising technology for processing low-grade solid fuel in a multistage plant;
- formation and dynamics of steam structures realized in a subcooled liquid as a result of laser radiation absorption, to substantiate the method of minimally invasive surgery;
- dynamics of the equipment of thermal power plants, to create software for simulators for training the personnel of thermal power plants.

Awards, part-time job in international academic organizations

Elected member of Scientific Council of International Centre for Heat and Mass Transfer
Certificate of honor by Presidium of the Siberian Branch of the Russian Academy of Sciences,
Certificate of honor by Irkutsk Scientific Centre

Key publications

Chernov, A. A., Pil'nik, A. A., Levin, A. A. at al. 2022. Laser-induced boiling of subcooled liquid: influence of the radiation power on the vapor bubble nucleation and growth: Laser-induced boiling of subcooled liquid. International Journal of Heat and Mass Transfer, 184, 122298.

Levin, A., Khan, P., 2021. Intensification of Non-Stationary Nucleate Boiling at Increasing Flow Velocity. Heat Transfer Engineering. 43(3-5), c. 388-396.

Levin, A.A., Safarov, A.S., Chudnovskii, V.M., Chernov, A.A. 2020. Modeling of non-stationary temperature field in the neighborhood of the optical fiber end under laser pulse heating. Interfacial Phenomena and Heat Transfer. 8(1), c. 25-32

Chudnovskii, V. M., Levin, A. A., Yusupov, V. I. 2020. The formation of a cumulative jet during the collapse of a vapor bubble in a subcooled liquid formed as a result of laser heating. International Journal of Heat and Mass Transfer, 150, 119286.

Chistyakov, V. F., Chistyakova, E. V., Levin, A. A. 2020. Application of underdetermined differential algebraic equations to solving one problem from heat mass transfer. In Lecture Notes in Computer Science. 12141 LNCS, c. 84-93

Levin, A., Khan, P. 2019. Characteristics of nucleate boiling under conditions of pulsed heat release at the heater surface. Applied Thermal Engineering, 149, pp. 1215-1222.

Levin, A.A., Khan, P.V. 2018. Experimental observation of the maximum bubble diameter in non-stationary temperature field of subcooled boiling water flow. International Journal of Heat and Mass Transfer, 124, pp. 876-883.

Aktershev, S. P., Levin, A. A., Mesentsev, I. V., & Mesentseva, N. N. 2018. Self-oscillatory regime of boiling of a highly subcooled liquid in a flow-passage annular duct. Thermophysics and Aeromechanics, 25(6), 875–887.

Levin, A. A., Tairov, E. A., Spiryaev, V. A. 2017. Self-excited pressure pulsations in ethanol under heater subcooling. Thermophysics and Aeromechanics, 24(1), 61–71.

Pavlenko, A. N., Tairov, E. A., Zhukov, V. E., Levin, A. A., Moiseev, M. I. 2014. Dynamics of transient processes at liquid boiling-up in the conditions of free convection and forced flow in a channel under nonstationary heat release. Journal of Engineering Thermophysics, 23(3), 173–193.

Pavlenko, A. N., Tairov, E. A., Zhukov, V. E., Levin, A. A., Tsoi, A. N. 2011. Investigation of transient processes at liquid boiling under nonstationary heat generation conditions. Journal of Engineering Thermophysics. 20(4), c. 380-406.

Tairov, E. A., Levin, A. A., Chistyakov, V. F. 2011. Using the theory of hydraulic circuits in simulating thermal power installations. Thermal Engineering, 58(13), c. 1094-1098.