Program

Zeldovich-100 Meeting

Subatomic particles, Nucleons, Atoms, Universe: Processes and Structure

international conference in honor of Ya. B. Zeldovich 100th Anniversary

March 10–14, 2014
Minsk, Belarus

vapor state near it. Details of this approach are discussed in the paper. Finally, we can state that provided of temperature and vapor supersaturation are calculated correctly classical nucleation kinetics will describe experimental results with an accuracy of about one order of magnitude.

References

1. Zeldovich Y.B. *Collected works*, Princeton, Princeton University Press, 1992. Vol. 1.

2. Bashkirov A.G., Fisenko S.P. Derivation of the Equations of the Theory of Nonisothermal Nucleation // *Theoretical and Mathematical Physics*, 1981, v. 48, pp. 636-640.

3. Fisenko S.P. Microstructure of the Supersaturation Field in Homogeneous Nucleation in a Vapor–Gas Mixture // *Technical Physics*, 2013, v. 58, pp. 658-663.

Controlled Detonation Combustion: Modeling and Experimentation

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In 1940, Ya. B. Zel'dovich has published his famous article "To the Question of Energy Use of Detonation Combustion" (JETP, 1940, Vol. 10, No. 17, pp. 1453-1461) where he proved theoretically that the thermodynamic cycle with detonation combustion is the most efficient for chemical ramjet engines. Since then there were many attempts worldwide to implement this cycle in practical devices. Reported herein are the physical principles and problems of controlling deflagration-to-detonation transition and detonation propagation in gaseous and two-phase reactive systems, as well as the most recent accomplishments of the author's group at Semenov Institute of Chemical Physics in relevant numerical and experimental studies. Several examples of numerically designed, fabricated and tested detonation devices are discussed, namely a 2-MW pulse detonation burner operating on natural gas-air mixture and a large-scale rotating-detonation combustor operating on hydrogen-air mixture.

On the Physical Meaning of the Sachs Form Factors of the Proton and on the Violation of the Dipole Dependence of G_E and G_M on Q^2

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In the one-photon exchange approximation we discuss questions related to the interpretation of unexpected results of the JLab polarization experiments to measure the Sachs form factors ratio G_E/G_M in the region $1.0 < Q^2 < 8.5$ GeV^2. For this purpose, we developed an approach which essentially is a generalization of the constituent-counting rules of the perturbative QCD (pQCD) for the case of massive quarks. We assume that at the lower boundary of the considered region the hard-scattering mechanism (HSM) of pQCD is realized.