ENTROPIC PHASE TRANSITIONS AND ACCOMPANYING ANOMALOUS THERMODYNAMICS REGIONS IN NONIDEAL PLASMAS

Iosilevskiy I.L.

[1] *JIHT RAS, Moscow, Russia,* [2] *MIPT, Dolgoprudny, Russia*
iosilevskiy@gmail.com

Remarkable features of *entropic* 1st-order phase transitions (S-PT) [1,2] are under discussion in comparison with well-known ordinary *enthalpic* (VdW-like) phase transitions (H-PT) [3]. The basic "driving" mechanism for the 1st-order S-transitions is forced decomposition of any bound complexes in a system: atoms, molecules, clusters etc. [4,5] up to the forced deconfinement of hadrons onto constituent quarks in far and exotic state of ultrahigh density and ultrahigh temperarure matter in interiors of neutron stars [6,7]. The key feature of 1st-order S-transition is opposite (negative) sign of latent heat of transition and consequently falling character of $P(T)$ dependence for S-PT. It results in appearance of anomalous thermodynamics regions both inside and outside of thw two-phase region of S-PT. This anomalous thermodynamics, accompanying S-PT, manifests itself [2,6] in simultaneous lost of positiveness for great number of second cross derivatives for Helmholtz free energy. The most important of them are Gruneizen parameter, thermal expansion coefficient and (isochoric) thermal pressure coefficient. Tight connections of thermodynamic and hydrodynamic anomalies are under discussion for shock and isentropic compression and expansion [2,6], for convective instability [7], mutual intersections for most of iso-lined, e.g. isotherms, isoentropes, shock adiabats (Hugoniot) curves etc. Remarkably complicated structure of stable and metastable domains within two-phase region of S-transitions is under discussions [4,5,6] in comparison with well-known simple topology of these domains for (VdW-like) H-transitions. Discussed anomalies are illustrated on the base of S-transitions revealed in last years via modeling calculations, e.g. [5], and in experiments both numerical and real. It is valid for the so-called dissociation- and ionization-driven phase transitions in WDM of hydrogen, nitrogen and other WDM fluids.

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