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Chemical Freeze-out Parameters Found by Hadron Resonance Gas Model with Induced Surface Tension

Tuesday, 10 July 2018 15:00 (30 minutes)

In this talk we present a generalization of the multicomponent Van der Waals equation of state in the grand canonical ensemble [1, 2]. For the one-component case the third and fourth virial coefficients are calculated analytically. It is shown that an adjustment of a single model parameter allows us to reproduce the third and fourth virial coefficients of the gas of hard spheres with small deviations from their exact values. A thorough comparison of the compressibility factor and speed of sound of this model with the one and two component Carnahan-Starling equation of state is made. We show that the model with the induced surface tension can reproduce the results of the Carnahan-Starling equation of state up to the packing fractions 0.2-0.22 at which the Van der Waals equation of state is inapplicable [1]. Using this approach we develop an entirely new hadron resonance gas model and apply it to a description of the hadron yield ratios measured at AGS, SPS, RHIC and ALICE energies of nuclear collisions. We confirm that the strangeness enhancement factor has a peak at low AGS energies and that there is a jump of chemical freeze-out temperature between two highest AGS energies [1, 2]. Also we argue that the chemical equilibrium of strangeness, i.e. $\gamma_s \simeq 1$, observed above the center of mass collision energy 8.7 GeV may be related to a hadronization of quark gluon bags which have the Hagedorn mass spectrum, and, hence, it may be a new signal for the onset of deconfinement.

1. K. A. Bugaev, V. V. Sagun, A. I. Ivanytskyi, I. P. Yakimenko, E. G. Nikonov, A.V. Taranenko and G. M. Zinovjev, Nucl. Phys. A 970, (2018) 133.
2. K. A. Bugaev, R. Emaus, V.V. Sagun, A. I. Ivanytskyi, L. V. Bravina, D. B. Blaschke, E. G. Nikonov, A. V. Taranenko, E. E. Zabrodin and G. M. Zinovjev, Phys. Part. Nucl. Lett. 15, (2018) 210.

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