

Four types of phase transitions in interacting meson (boson) matter at high temperatures

Wednesday, May 29, 2024 2:45 PM (12 minutes)

Within the framework of the mean field model, the thermodynamics of the relativistic scalar system of interacting particles and antiparticles in the presence of a Bose-Einstein condensate was investigated. It is assumed that the total isospin (charge) density is conserved. It is shown that the particle-antiparticle boson system reveals four types of phase transitions into the condensate phase. Three types belong to the phase transition of the second order and one to the first order. We show that the grand canonical ensemble is not suitable for describing bosonic system of particles and antiparticles in the presence of a condensate, but an adequate study can be carried out within the framework of the canonical ensemble, where the chemical potential is a thermodynamic quantity that depends on the canonical free variables.

Primary authors: Dr ZHURAVEL, Denys (Bogolyubov Institute for Theoretical Physics of the National Academy of Sciences of Ukraine); Prof. ANCHISHKIN, Dmitry (Bogolyubov Institute for Theoretical Physics of the National Academy of Sciences of Ukraine); Dr GNATOVSKYY, Volodymyr (Faculty of Physics, Taras Shevchenko National University of Kyiv)

Presenters: Dr ZHURAVEL, Denys (Bogolyubov Institute for Theoretical Physics of the National Academy of Sciences of Ukraine); Prof. ANCHISHKIN, Dmitry (Bogolyubov Institute for Theoretical Physics of the National Academy of Sciences of Ukraine)

Session Classification: Session VI

Track Classification: Particle physics theory (including heavy ion & neutrino physics)