A new mechanism of bubble formation in first order phase transition from supercooled quark-gluon plasma into hadron gas

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Abstract

We propose a new mechanism for formation of critical bubbles in the first order phase transition of supercooled quark-gluon plasma into hadron gas. Within a toy model where the two phases are described, respectively, by massless free quark-gluon gas and massless pion gas, we require local conservation of energy during the formation of a critical bubble. Consequences from this requirement are that the critical radius of the bubble is constant independent of the temperature while the temperature inside the critical bubble just formed is, in general, different from the temperature of the quark-gluon gas just before the bubble formation. These features are in sharp contrast to the conventional scenario where the temperature T of the bubble region is assumed to be constant during the bubble formation and the critical radius diverges when T approaches the critical temperature.

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