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## Mapping the Little Bangs Through Energy Density and Temperature Fluctuations

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Heavy-ion collisions at relativistic energies, which are accessible at the Relativistic Heavy Ion Collider (RHIC) and the Large Hadron Collider (LHC), are often referred to as little bangs. Experiments at these energies probe the conditions which prevail at freeze-out, and often it is not possible to define the correct equation-of-state (EoS) and the conditions at the initial stages of the collision. By employing hydrodynamic evolution of the fireball [1] created in the collisions, we have generated maps of the energy density ( $\epsilon$ ) and temperature ( $T$ ) of the system throughout its evolution. With the help of the maps, we obtain time evolution of the fluctuations in  $\epsilon$  and  $T$ . We have shown for the first time that the method of interpolation of fluctuations obtained from the maps can provide a powerful technique in looking back at the initial stages of the heavy-ion collisions.

In case of cosmic microwave background radiation (CMBR), temperature maps of the sky [2], made by scanning in  $\theta$ - $\phi$  bins, provide vital information regarding the age and composition of the Universe, galaxy formation, expansion rate, etc. This is possible by analyzing the map to extract temperature fluctuations and making power spectrum. For heavy-ion collisions, we propose to make temperature maps in rapidity and azimuthal angle ( $y$ - $\phi$ ). This is demonstrated by using the AMPT event generator. By making correspondence with the evolution of fluctuations from hydrodynamics, vital information regarding the fireball can be obtained at very early stage and throughout the evolution of the system [3]. We will present this new method, first results and make the proposal for its application to experimental data at RHIC and LHC.

[1] H. Holopainen, H. Niemi and K.J. Eskola, Phys. Rev.C 83, 034901(2011).

[2] C. L. Bennett et al. [WMAP Collaboration], Astrophys. J. Suppl. 148, 1(2003); E. Komatsu et al. [WMAP Collaboration], arXiv:0803.0547 [astro-ph].

[3] S. Basu, R. Chatterjee, B.K. Nandi and T.K. Nayak (arxiv : 1405.3969).

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