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Second order hydrodynamics, anisotropic expansion and holographic dual of QGP

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AdS/CFT correspondence has provided a very important tool for studying the strongly coupled dynamics in a class of superconformal field theories, in particular, $calN = 4$ super Yang-Mills theory and the corresponding gravity dual description in AdS space-time. In this work, we have used time dependent AdS/CFT correspondence to study the expansion of the strongly coupled QGP (Quark-Gluon-Plasma) and the corresponding gravity dual description. In the context of the expanding plasma, we have considered non-isotropic expansion in three dimensions which is a generalization of Bjorken's one dimensional expansion. Using Kasner space-time as the local rest frame and second order relativistic viscous hydrodynamics, we study the late time behaviour of the Bjorken flow. Solving the conservation equation for the energy-momentum and using conformal invariance, we obtain the explicit expression for the energy density as a function of proper time in terms of Kasner parameters. The proper time dependence of the temperature has also been obtained in terms of Kasner parameters. We have studied the dual geometry in the large proper time regime in Eddington-Finkelstein type coordinates.

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