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Hydrodynamic description of direct photon spectrum and elliptic flow

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In high energy heavy ion collisions a new state of matter, the strongly coupled quark gluon plasma is formed that exhibits the similar properties as our Universe had just a couple of microseconds after the Big Bang, hence such collisions are usually referred as Little Bangs. Subsequent investigations showed that the created medium is a nearly perfect fluid whose time evolution can be described by hydrodynamic models. The distribution of the hadrons that are created in the freeze-out after a rapid expansion carry information about the final state. On the other hand, with penetrating probes, e.g., with direct photons, one can model the time evolution of the quark gluon plasma. I present a hydrodynamic model that was inspired by an analytical solution of relativistic hydrodynamics, calculate the invariant transverse momentum spectrum and the elliptic flow of direct photons and compare our results to data to obtain the value of the model parameters. Based on the the results we give an estimation for the initial temperature of the plasma.

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