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Exact analytic hydrodynamical results and estimations of the initial conditions in p+p and Pb+Pb collisions at LHC

Simple and exact solutions of relativistic hydrodynamics are presented, including the first exact solution of relativistic hydrodynamics with non-zero total angular momentum, an important characteristics of mid-central and peripheral heavy ion collisions. The consequences of these new solutions are explored in data analysis. The effects of longitudinal work, acceleration and the rotation of the fluid are taken into account in an advanced estimate of the initial energy density, temperature, pressure and the life-time of the reaction.
This advanced estimate of the initial energy density yield values that are significantly larger in Pb+Pb collisions at LHC energies than the 15 GeV/fm**3 initial energy densities obtained from Bjorken's estimate.

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