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Relativistic theory of hydrodynamic fluctuations

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Hydrodynamic fluctuations have been applied to a wide variety of physical, chemical, and biological phenomena in the past decade. In the context of high energy heavy ion collisions, there will be intrinsic fluctuations due to the finite size and finite particle content even if the initial conditions are fixed. We develop the theory of relativistic fluctuations, and apply it to a 1+1 dimensional boost invariant model. In analogy to the cosmic microwave background radiation, fluctuations might provide information on the equation of state, including a possible critical point, and on the transport coefficients.

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