QUARK MATTER 2015
Sep. 27 – Oct. 3, 2015 Kobe, Japan

Contribution ID: **653** Type: **Contributed talk**

Third order relativistic dissipative fluid dynamics in heavy-ion collisions and astrophysics

Monday 28 September 2015 11:55 (20 minutes)

The development of relativistic dissipative fluid dynamics is a very important scientific achievement of the last two decades. It has inspired many authors to apply its methodology to lots of possible applications in physical problems. For example it allows to derive hydrodynamical like equations for relativistic heavy-ion collisions, astrophysics, cosmology and plasma physics. So far a symmetric hyperbolic system of evolution equations for the independent field variables has been obtained up to second order with respect to thermodynamic equilibrium. However the exploitation to third order is desirable in order to study the couplings between the three major dissipative fluxes which contribute to the entropy generation in a single-component fluid. In this paper the development of relativistic fluid dynamics is carried through
to third order with respect to thermodynamic equilibrium. The set of obtained field equations is closed by imposing the relativity principle and the entropy principle up to third order. Imposing these conditions up to third order affects and restricts the lower order terms. This, in turn, affects the equilibrium expressions which are already explicitly known.

On behalf of collaboration:

NONE

Author: MURONGA, Azwinndini (University of Johannesburg)

Presenter: MURONGA, Azwinndini (University of Johannesburg)

Session Classification: New Theoretical Development I

Track Classification: New Theoretical Developments