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Abstract

On the Relation of Eckart and Landau-Lifshitz Reference Frames for Higher Orders in the Dissipative Fluxes Couplings †

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In the kinetic description of a relativistic gas, macroscopic quantities are usually studied either in the reference frame that moves with the fluid (the so-called Eckart frame) or in the frame where there is no energy dissipation flux (Landau Lifshitz frame). In a closer and detailed view, the Landau Lifshitz reference frame requires several approximations to relate it with the Eckart's or particle frame. For the energy-momentum tensor not contain energy fluxes is necessary to neglect couplings among dissipative flows. It is well known that at first order particle 4-flux contains a dissipative term related to the heat flux and also defines a Lorentz reference frame through a timelike vector. In this work, we relate these reference frames up to higher orders in dissipative fluxes couplings and compare the properties of the corresponding systems of transport equations in both frames emphasizing the entropy balance and its consistency with the second law.