Abstract Submitted
for the APR11 Meeting of
The American Physical Society

Classical relativistic ideal gas in thermodynamic equilibrium in a uniformly accelerated reference frame DOMINGO LOUIS-MARTINEZ, University of British Columbia — A classical (non-quantum-mechanical) relativistic ideal gas in thermodynamic equilibrium in a uniformly accelerated frame of reference is studied using Gibbs's microcanonical and grand canonical formulations of statistical mechanics. Using these methods explicit expressions for the particle, energy and entropy density distributions are obtained, which are found to be in agreement with the well known results of the relativistic formulation of Boltzmann's kinetic theory. Explicit expressions for the total entropy, total energy and rest mass of the gas are obtained. The position of the center of mass of the gas in equilibrium is found. The non-relativistic and ultrarelativistic approximations are also considered. The phase space volume of the system is calculated explicitly in the ultrarelativistic approximation.

Domingo Louis-Martinez
University of British Columbia

Date submitted: 12 Jan 2011 Electronic form version 1.4