

A Unification and Relativistic Correction for Boltzmann's Law

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Abstract : The distribution of velocities of particles in plasma is a well understood discipline of plasma physics. Boltzmann's law and the Maxwell-Boltzmann distribution describe the distribution of velocity of a particle in plasma as a function of mass and temperature. Particles with the same mass tend to have the same velocity. By expressing the same law in terms of energy alone, the author obtains a distribution independent of mass. In summary, for particles in plasma, the energies tend to equalize, independent of the masses of the individual particles. For high-energy plasma, the original law predicts velocities greater than the speed of light. If one uses Einstein's formula for energy ($E=mc^2$), then a relativistic correction is not required.

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