Abstract

This poster profiles an approximate and an exact method of calculating the effect of reactions between neutrinos and electrons/positrons on Big Bang Nucleosynthesis. These reactions cause the neutrino distribution functions to change with time according to the Boltzmann equation. In a 1984 paper Rothman and Matzner outline the approximate method, which used average values of the reaction rates and the changes in the distribution functions. This method calculates increases in the energy densities ρ_{ν_e} and $\rho_{\nu_{\mu,\tau}}$ of 0.76 % and 0.35 %, and the ^{4}He mass fraction $X_{^4He}$ by 4.64 $\times 10^{-4}$. But I've written a scheme that explicitly solves the Boltzmann equation to calculate the actual distribution functions. This method yields increases of 0.93 % and 0.38 % for the energy densities, and 1.6 $\times 10^{-4}$ for the mass fraction, and can show the momentum dependence of the distribution function increase.