

Active and sterile neutrino dynamics below the electroweak crossover

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I will summarize a recent estimation (arXiv:1605.07720) of the thermal masses and damping rates of active ($m < \text{eV}$) and sterile ($M \sim \text{GeV}$) neutrinos with thermal momenta $k \sim 3T$ at temperatures below the electroweak crossover ($5 \text{ GeV} < T < 160 \text{ GeV}$). These quantities in turn fix the washout rates of Standard Model lepton number densities and the thermal production rate of sterile neutrinos. These interact via direct scatterings mediated by Yukawa couplings, and via their overlap with active neutrinos. I will review the calculation, which includes all leading order reactions. I will show that the resulting washout rate generally exceeds the Hubble rate for $5 \text{ GeV} < T < 30 \text{ GeV}$. Therefore it is challenging to generate a large lepton asymmetry facilitating dark matter computations operating at $T < 5 \text{ GeV}$, whereas the generation of a baryon asymmetry at $T > 130 \text{ GeV}$ remains an option.

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