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Beyond Standard Model Decays During the Big Bang Nucleosynthesis Epoch[1] HANNAH RASMUSSEN, ALEX MCNICHOL, CHAD KISHIMOTO, University of San Diego — We explore Beyond Standard Model (BSM) physics models of out-of-equilibrium particle decay in the early universe around the time of Big Bang Nucleosynthesis (BBN). In particular, we look into the decay of massive neutral fermions (e.g., "sterile neutrinos") into Standard Model particles that will heat the photon-electron-positron-baryon plasma during the BBN epoch and produce non-thermal high-energy neutrinos and antineutrinos of all flavors. By considering the production and scattering of these high-energy neutrinos, we investigate the implications of this process on cosmological observables such as the number of relativistic degrees of freedom, $N_{\rm eff}$, and the sum of the neutrino masses, and further discuss possible effects of changing the time-temperature relation and a non-thermal high-energy distribution of neutrinos and antineutrinos on BBN yields.

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