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Beyond Standard Model Decays During the Big Bang Nucleosynthesis Epoch[1] CHAD KISHIMOTO, HANNAH RASMUSSEN, ALEX MCNICHOL, Univ of San Diego — In this talk, 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, diluting decoupled particles, and will produce non-thermal high-energy neutrinos of all flavors. By considering both the production and scattering of these high-energy neutrinos, we investigate the observable consequences of this process in cosmological observables such as the number of relativistic degrees of freedom ($N_{\rm eff}$) and the sum of the neutrino mass, and discuss the possible effects of changing the time-temperature relation and an non-thermal high-energy distribution of neutrinos and anti-neutrinos on BBN yields.

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