Within the framework of the Standard Model of particle physics and standard cosmology, observations of the Cosmic Microwave Background (CMB) and Baryon Acoustic Oscillations (BAO) set stringent bounds on the sum of the masses of neutrinos. If these bounds are satisfied, the upcoming KATRIN experiment which is designed to probe neutrino mass down to ∼0.2 eV will observe only a null signal. We show that the bounds can be relaxed by introducing new interactions for the massive active neutrinos, making neutrino masses in the range observable by KATRIN compatible with cosmological bounds. Within this scenario, neutrinos convert to new stable light particles by resonant production of intermediate states around a temperature of T∼ keV in the early Universe, leading to a much less pronounced suppression of density fluctuations compared to the standard model.