

Hidden in the background: BBN photodisintegration limits on relics decaying into neutrinos.

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Constraints on dark sector particles decaying into neutrinos typically focus on their impact on the effective number of relativistic species, N_{eff} , in the early Universe. However, for heavy relics with longer lifetimes, constraints mainly arise from the photo-disintegration of primordial abundances. The high-energy neutrinos injected by the decay can interact with both the thermal neutrinos and other high-energy neutrinos. Among these interactions, annihilations into electromagnetic particles will induce an electromagnetic cascade that affects the abundances of the already formed light elements via photo-disintegration. In this work, we present constraints on these dark sector particles. Specifically, we implement a Monte Carlo code to simulate the electromagnetic cascade, instead of solving the full set of Boltzmann equations. We find improved bounds on the particle's lifetime, abundance, and mass.

Title of the Poster/Talk

BBN constraints on neutrino injection into the early Universe

Related Papers/Preprints

Primary authors: FRERICK, Jonas (DESY-T); Dr SCHMIDT-HOBERG, Kai (Deutsches Elektronen-Synchrotron DESY); Dr HUFNAGEL, Marco (Service de Physique Théorique, Université Libre de Bruxelles); DEPTA, Paul Frederik (Max-Planck-Institut für Kernphysik); BIANCO, Sara (DESY Hamburg); Dr HAMBYE, Thomas (Service de Physique Théorique, Université Libre de Bruxelles)

Presenter: BIANCO, Sara (DESY Hamburg)

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