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# Erratum: Stable bound states of asymmetric dark matter [Phys. Rev. D 90, 055030 (2014)]

Mark B. Wise and Yue Zhang

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The discussion between Eq. (32) and the paragraph that starts after Eq. (34) was not correct. It should be replaced by the following:

When $t < 1/\tau_\phi$ in the early universe, there is a plasma of $\phi$ particles which couples to the DM. In order to calculate the averaged bound state formation and dissociation rates in this plasma, we need to know the energy/momentum distributions of $\chi$ and $\phi$. At very high temperature, the mediator $\phi$ was in thermal equilibrium with SM fermions via the Higgs boson exchange, $\phi\phi \leftrightarrow f\bar{f}$. This is controlled by the cross quartic $\lambda_{\phi h}$ coupling in Eq. (1). The current Higgs invisible width limit requires $\lambda_{\phi h} \lesssim 2 \times 10^{-2}$. We fix $\lambda_{\phi h} = 0.01$ in the following discussion. For $m_\phi \sim$ GeV, we find the annihilation process $\phi\phi \leftrightarrow f\bar{f}$ freezes out at $T_{cd} \sim m_\phi/10$. After that, the comoving $\phi$ number does not change and the velocity of $\phi$ simply redshifts. Eventually, at $T \sim 1$ MeV, $\phi$ begins to decay. Therefore, the phase-space distribution of $\phi$ is

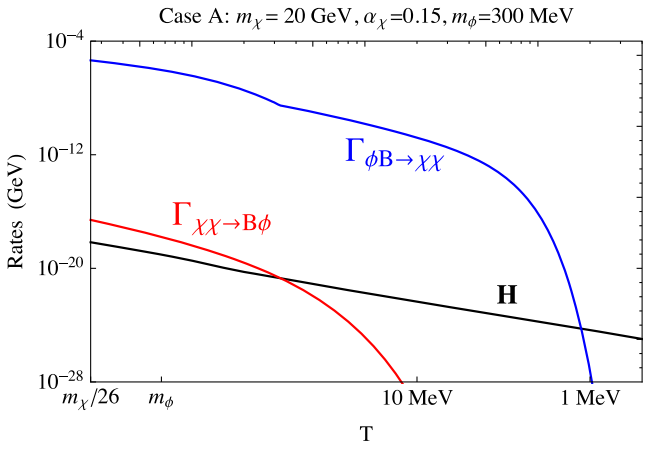


FIG. 4 (color online). Update to the left panel of Fig. 4.

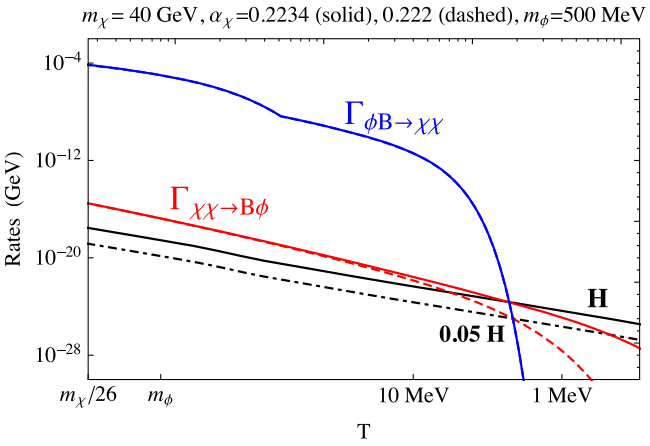


FIG. 5 (color online). Update to the left panel of Fig. 5.

 

$$f_\phi(k) \simeq \begin{cases} e^{-m_\phi/T} e^{-k^2/(2m_\phi T)}, & T \geq T_{cd} \\ e^{-m_\phi/T_{cd}} e^{-k^2 T_{cd}/(2m_\phi T^2)} e^{-1/(2H\tau_\phi)}, & T < T_{cd} \end{cases}. \quad (1)$$

This implies that $T = T_\gamma = T_\phi = T$.

As a consequence, the figures in the cosmology section change. Most of these changes are quite small and don't impact the physics. Below we have the new figures for the left panels of Figs. 4 and 5 where the changes are more noticeable.

We also take this opportunity to note that in Eq. (16), $\eta = 1/a_0$ and $\xi = 1/(a_0 p)$.