



$$\frac{dE}{dV dt} \Big|_{\text{DM}}(z) = n_{\text{pairs}} \cdot P_{\text{ann}} \cdot E_{\text{ann}} \cdot f(z) = \frac{n_{\text{DM}}}{2} \cdot \langle \sigma v \rangle \cdot n_{\text{DM}} \cdot 2m_{\text{DM}}c^2 \cdot f(z)$$

$$= \rho_c^2 c^2 \Omega_{\text{DM}}^2 (1+z)^6 \boxed{f(z)} \boxed{\frac{\langle \sigma v \rangle}{m_{\text{DM}}}}$$

$$p_{\text{ann}}(z) = f(z) \frac{\langle \sigma v \rangle}{m_{\text{DM}}}$$

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