1. Signals in axion cavities

$$P_a = \left(g_{a\gamma\gamma}^2 \, \frac{\rho_a}{m_a} \right) \left(B_0^2 \, V \, \frac{C_{0l}}{Q_l} \right) \sum \frac{\Delta\omega}{2\pi} T_{Q_l}(\omega) \, T_{Q_a}(\omega)$$

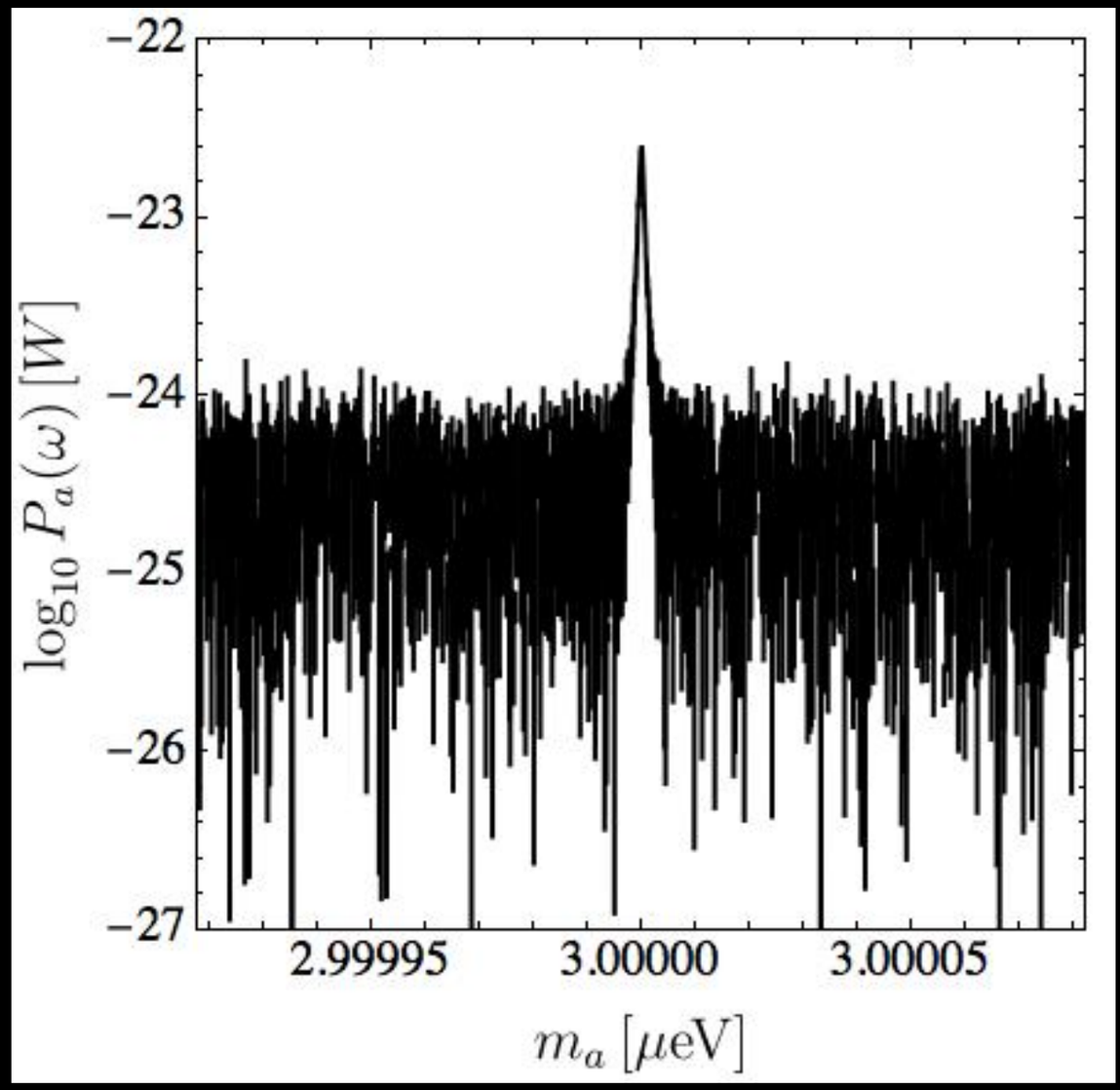
$$T_Q(\omega) = \left[\left(\frac{\omega}{m_a} - 1 \right)^2 + \frac{1}{4Q^2} \right]^{-1}$$

+ Johnson white noise with

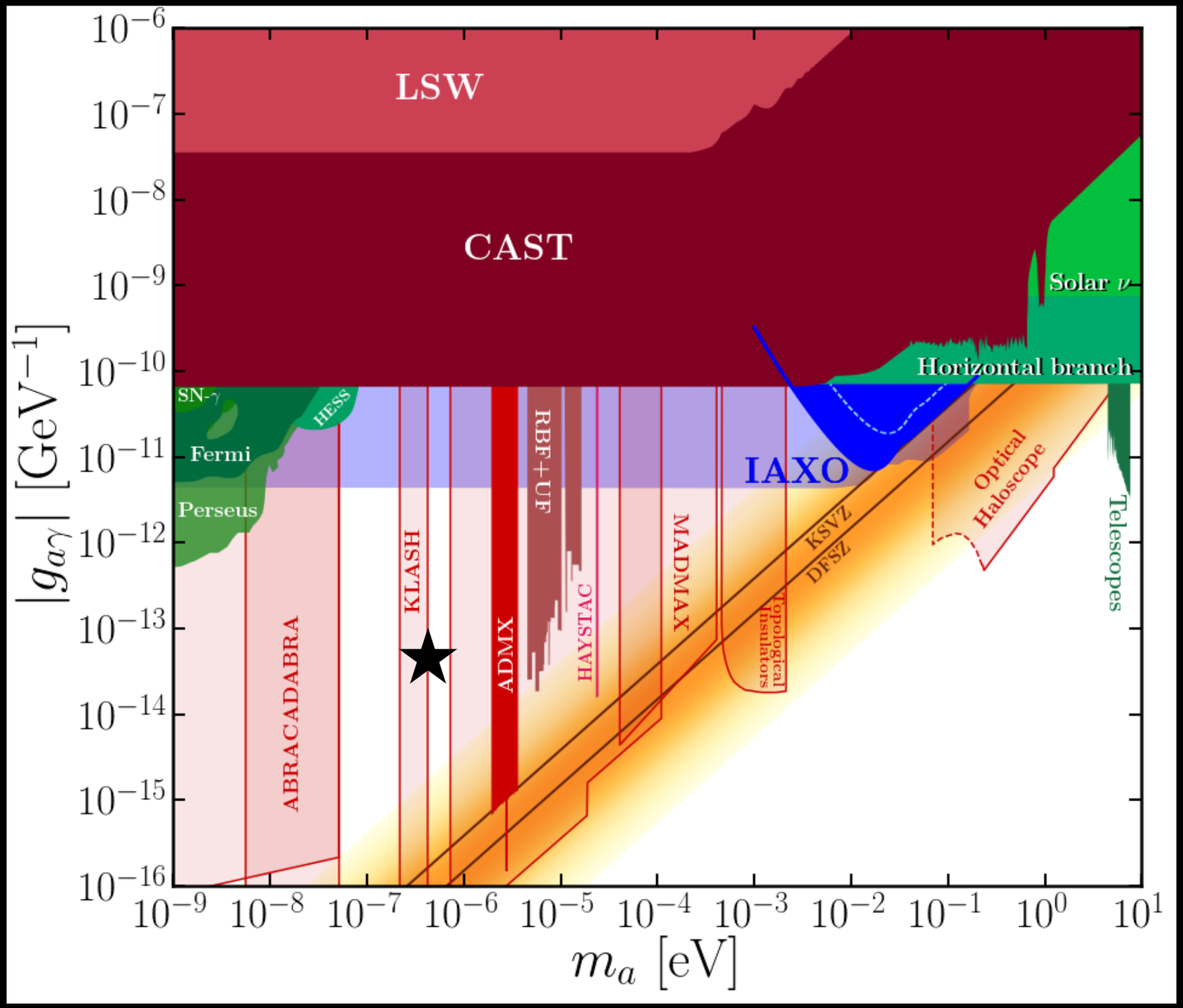
$$P_N = k_B T_{\text{noise}} \, \Delta\nu$$

$$\sigma_N = P_N / \mathcal{N}$$

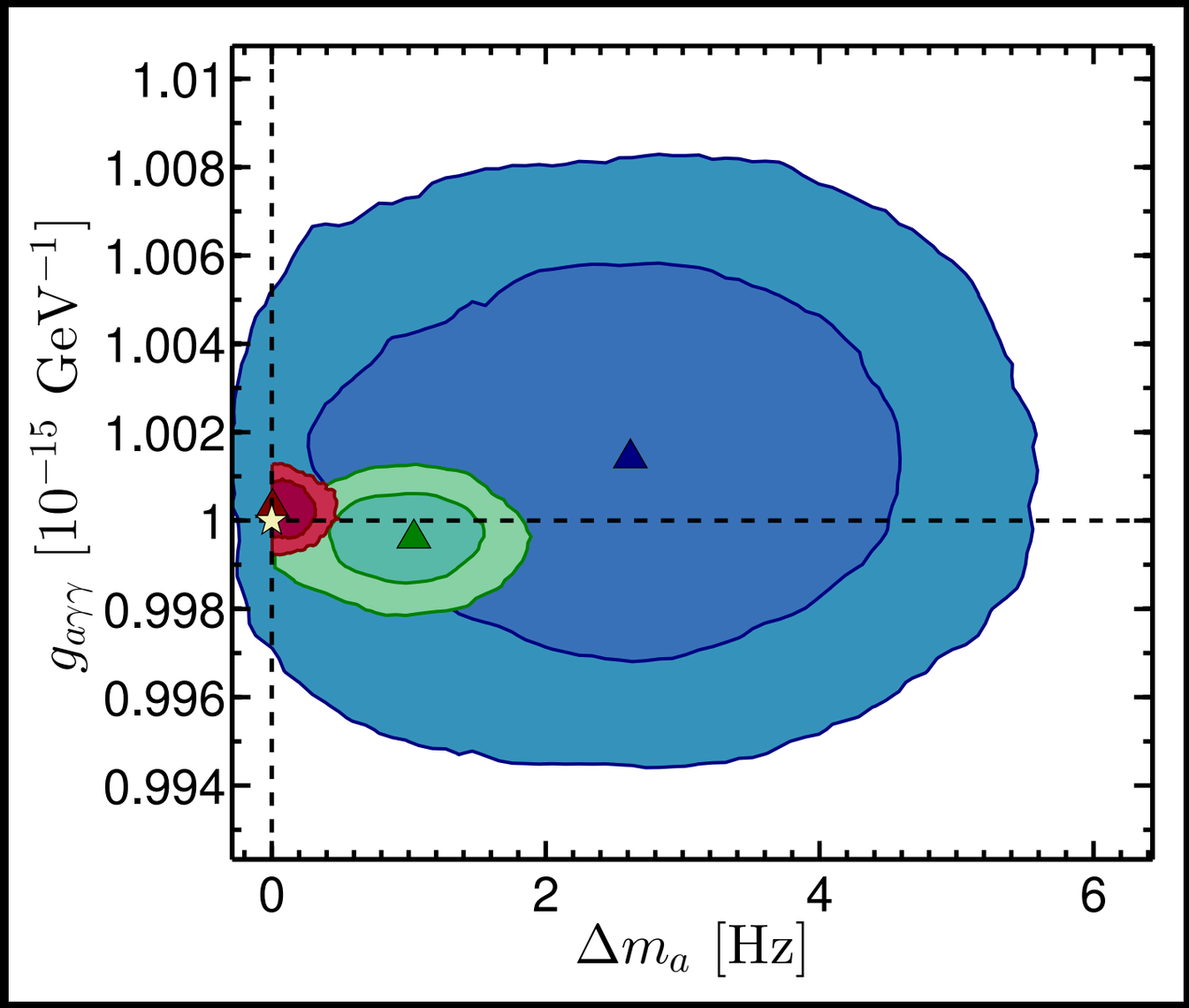
The goal is to determine to which precision I can disentangle $g_{a\gamma\gamma}$ and ρ_a



1. Signals in axion cavities

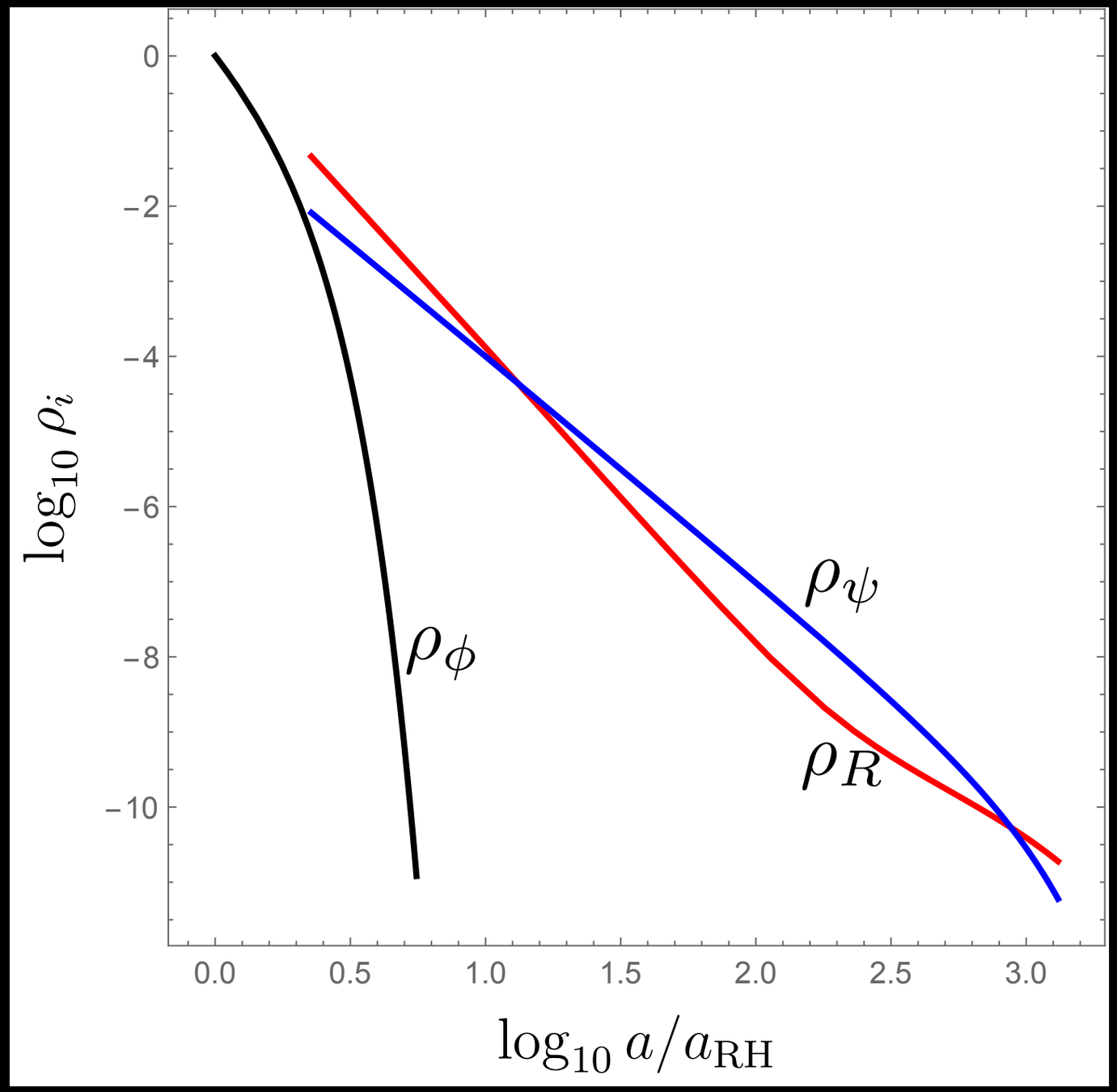


I. Signals in axion cavities



O'Hare and Green 1701.03118

2. Modified cosmologies



Early matter-dominated cosmology

$$\rho_\phi + 3H\rho_\phi = -\Gamma\rho_\phi$$

$$\rho_R + 4H\rho_R = b\Gamma\rho_\phi$$

$$\rho_\psi + \omega H\rho_\psi = (1-b)\Gamma\rho_\phi$$

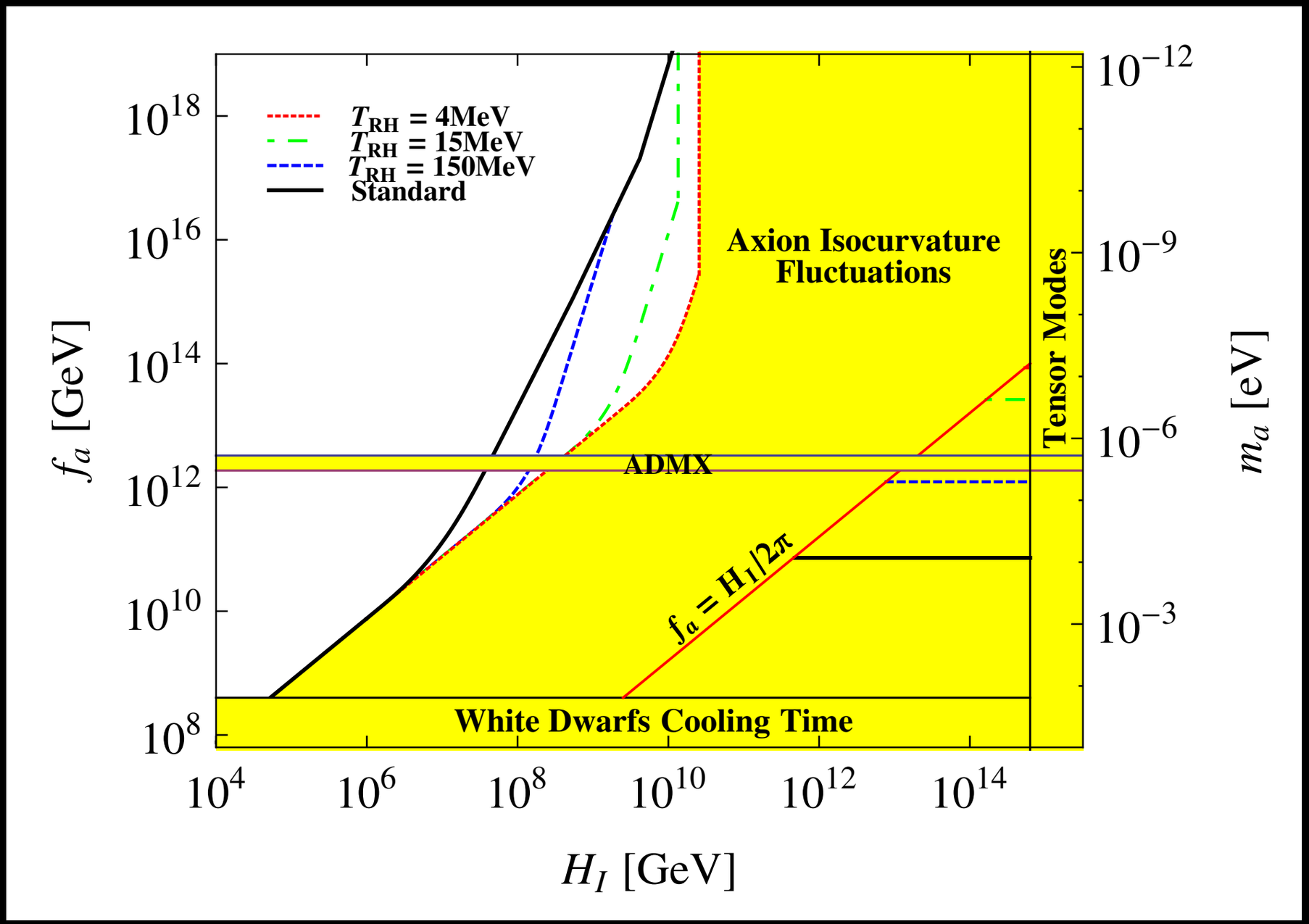
Dependence on two parameters:

ω and Γ (or $T_{\rm RH}$)

2. Modified cosmologies

$m_a \sim 0.1 \div 10\,\mu\mathrm{eV} \ll \mathrm{standard\,scenario}$

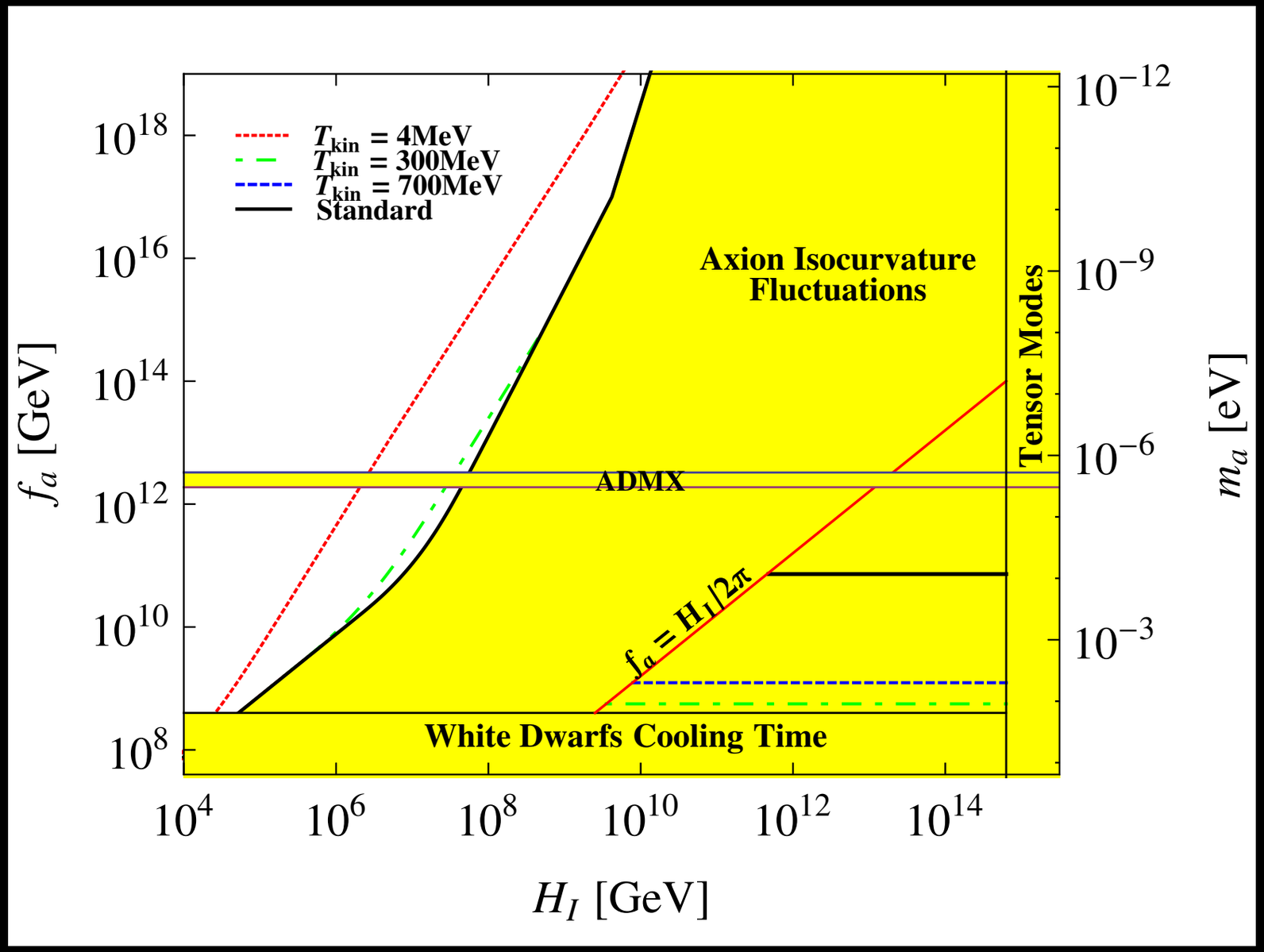
$f_a \sim 10^{15}\,\mathrm{GeV} \qquad \omega = 2/3$



2. Modified cosmologies

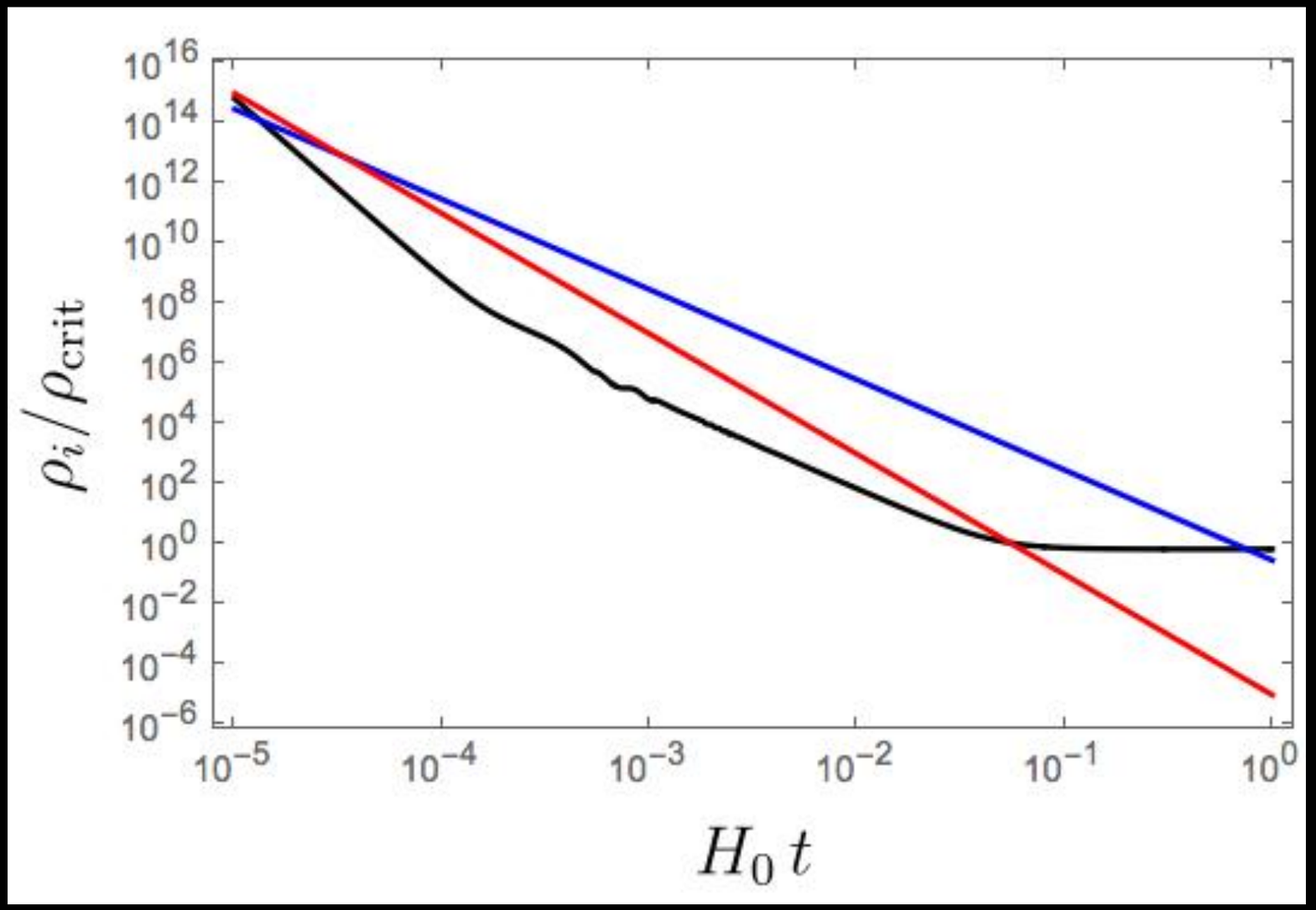
$m_a \sim 10\,\mathrm{meV}$

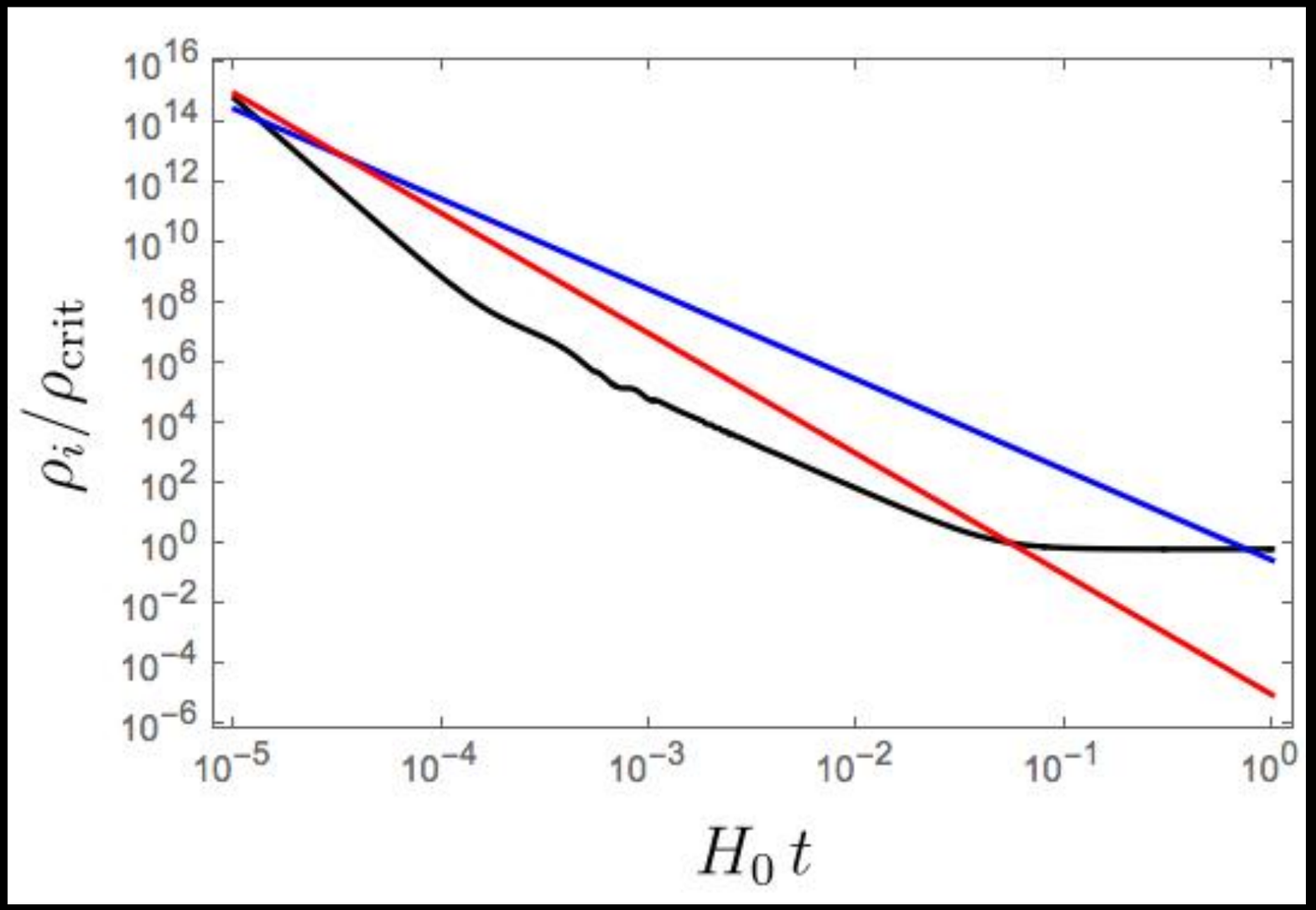
$f_a \sim 10^{9 \div 10}\mathrm{GeV}$ $\quad$ $\omega = 1/3$



3. Addressing the H0 tension

H0 tension is addressed by
dark matter => dark energy conversion



3. Addressing the H0 tension

$$\rho_\phi(a) = \rho_\phi \Theta\left(a - a_*\right) + \rho_\phi \left(\frac{a}{a_*}\right)^{-3} \Theta\left(a_* - a\right)$$