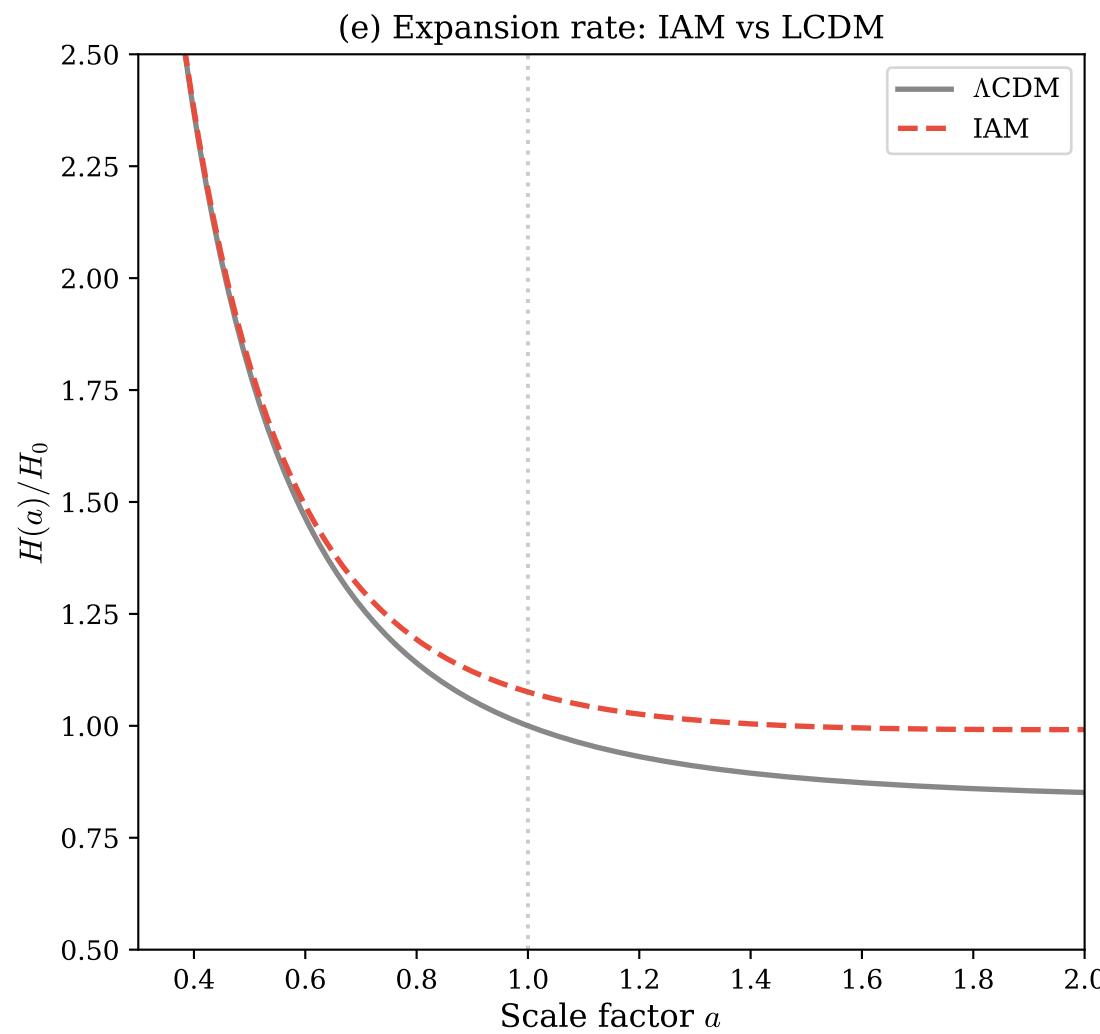
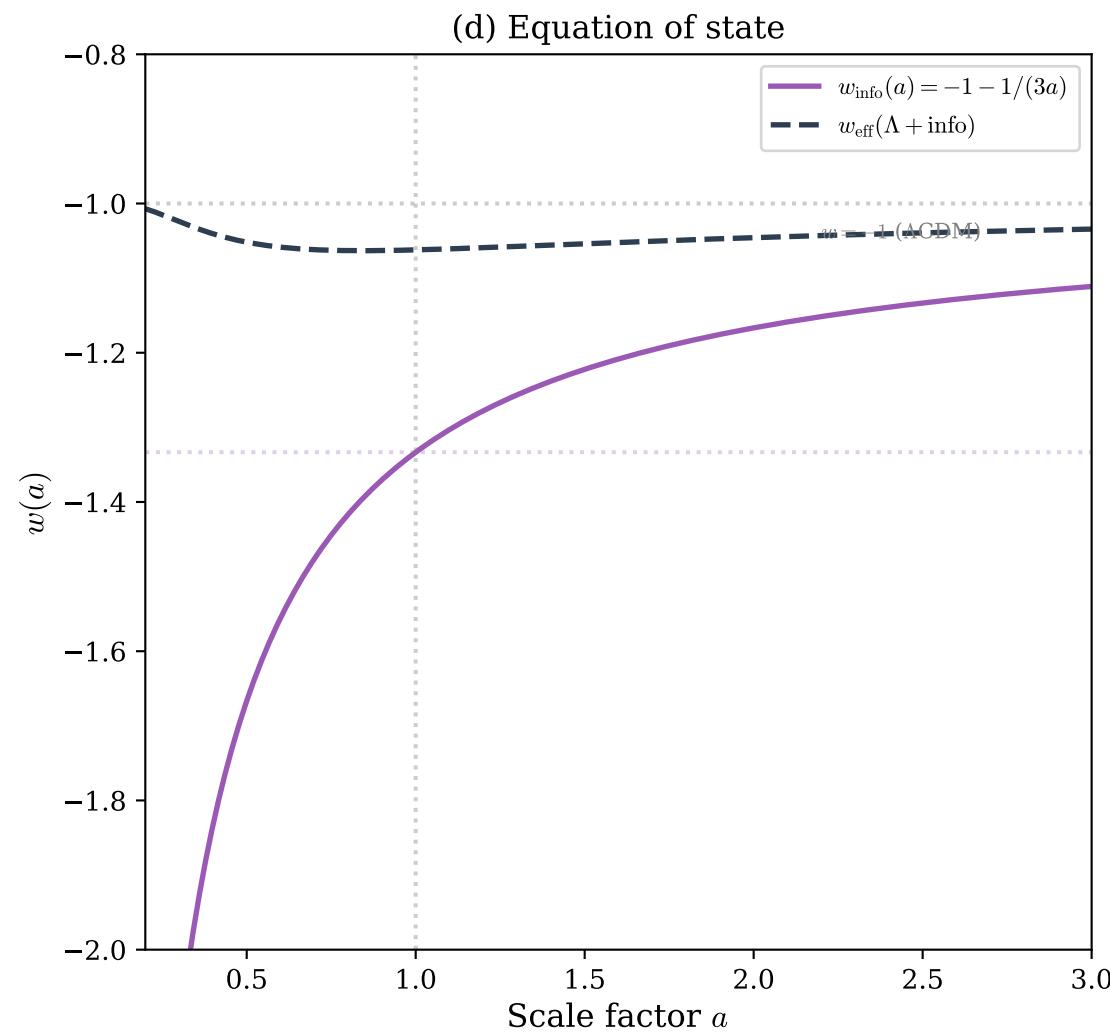
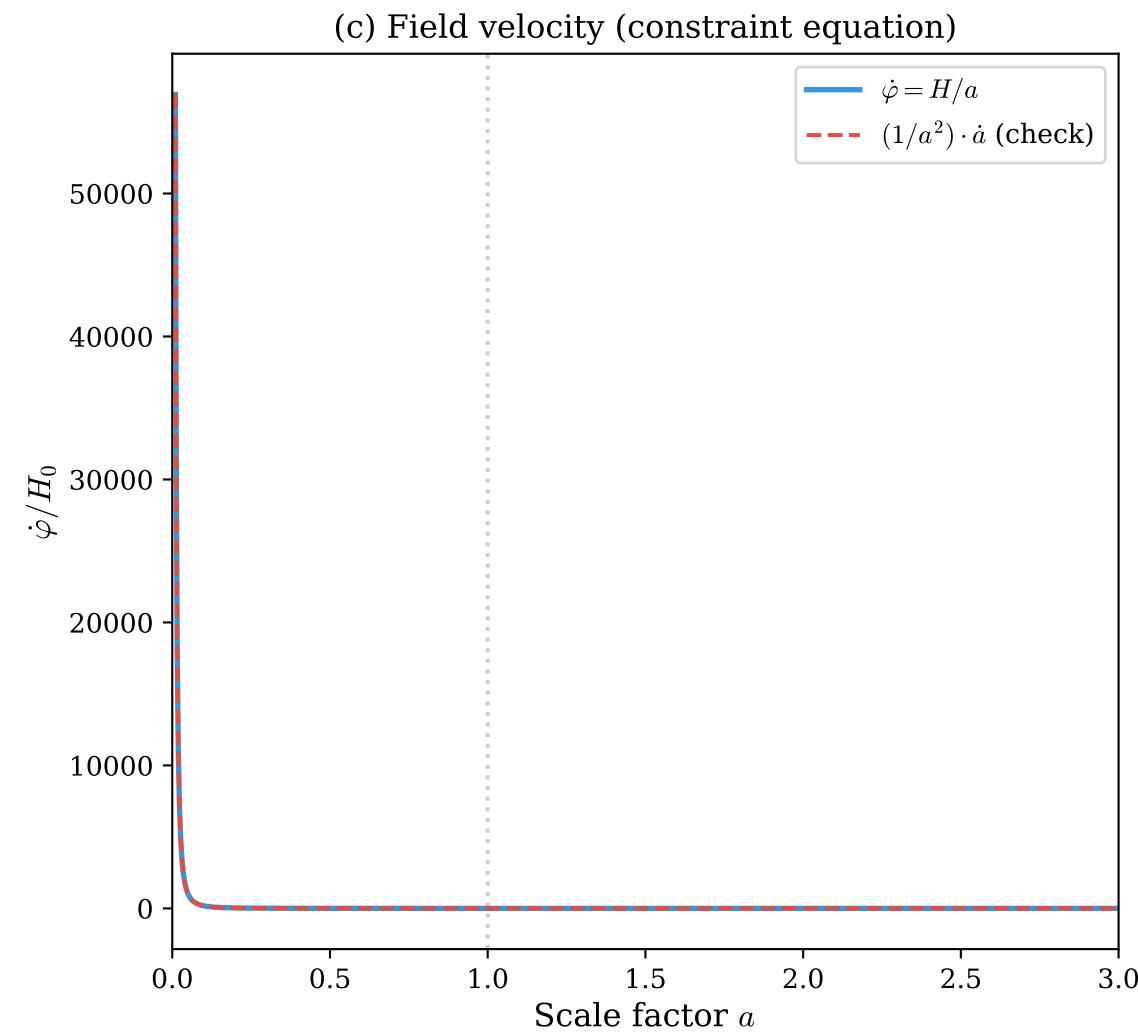
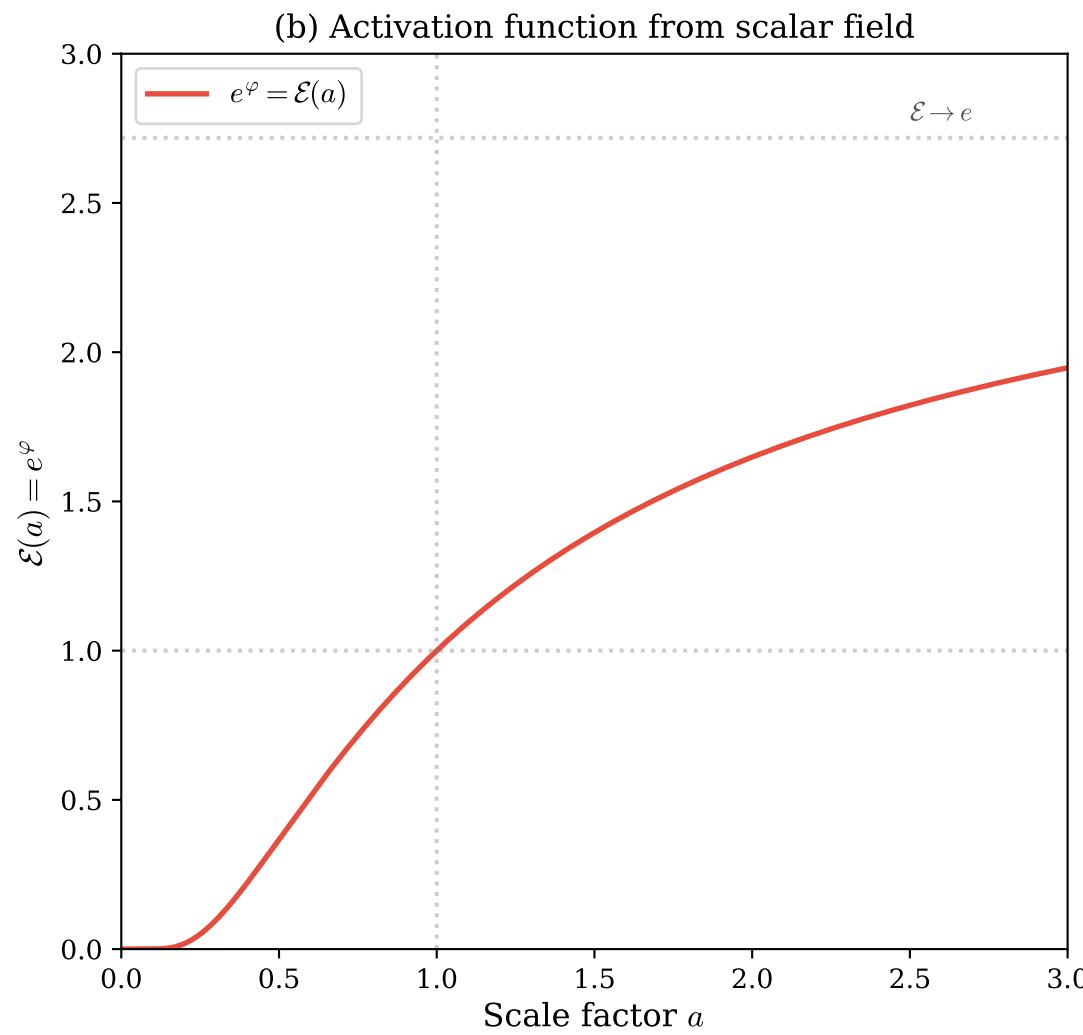
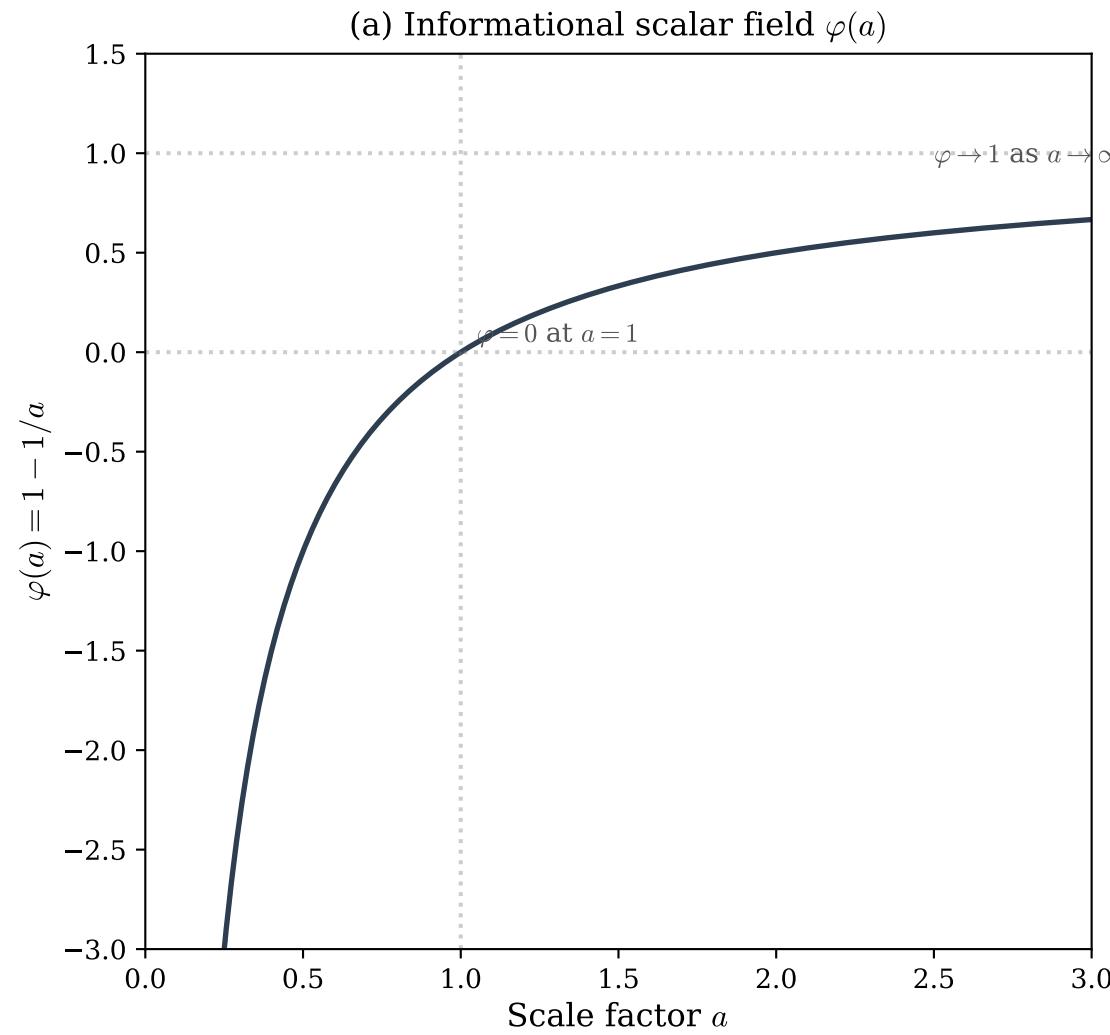


## Phase 4: The Informational Scalar Field and Action Principle



### THE ACTION PRINCIPLE

$$S = S_{\text{EH}} + S_\Lambda + S_{\text{matter}} + S_{\text{info}}$$

$$S_{\text{info}} = \int \frac{3H_0^2}{8\pi G} \beta e^\varphi + \lambda(\dot{\varphi} - H/a) \sqrt{-g} d^4x$$

Variation → Modified Friedmann equation:  
 $H^2 = \frac{8\pi G}{3} \rho + \frac{\Lambda}{3} + \beta e^{1-1/a} H_0^2$

Equation of state:  
 $w_{\text{info}}(a) = -1 - \frac{1}{3a}$

The constraint  $\dot{\varphi} = H/a$  is the NEW PHYSICS:  
the scalar field tracks cumulative decoherence,  
not its own Klein-Gordon dynamics.