DARK ENERGY WITHOUT DARK ENERGY

Accelerating Universe

- *Dark Energy*
- *Cosmological Constant*
- *Modified Gravity*

A Most Economic Model:

Dark Energy Without Dark Energy

$$\Psi = R(r,t)e^{\frac{iS(r,t)}{\hbar}}$$

Klein-Gordon (Real Part) :Bohm Theory

$$\boxed{E^2 - p(v)^2 + \tilde{V}_{SQ}^2 = m_0^2}$$

$$\boxed{\tilde{V}_{SQ} = \hbar\sqrt{\frac{\nabla^2 R - \ddot{R}}{R}}}$$

Tachyonic Procedure

$$\tilde{L} = \int d\dot{q}p = \int dv \sqrt{\tilde{V}_{SQ}^2 - m_0^2 + \frac{m_0^2}{1-v^2}}$$

$$\dot{q}^2 \equiv v^2 \Rightarrow \dot{\phi}^2$$

$$m_0 \Rightarrow V(\phi)$$

Up-Grading

$$L = -V\left(E(x,k) - \sqrt{1-\dot{\phi}^2}\right) \underset{\hbar \to 0}{\Rightarrow} 0$$

Elliptic Integral of 2nd Kind

$$x = \arcsin\sqrt{1-\dot{\phi}^2} \qquad k = \sqrt{1-\frac{V_{SQ}^2}{V(\phi)^2}}$$

Energy Density: $$\rho = 6\pi G(\dot{H}^{-1} H\dot{\phi}V_{SQ})^2$$

Pressure: $$p = -\left(1 + \frac{2\dot{H}}{3H^2}\right)\rho = w\rho$$

Friedmann Eq.: $$H^2 = \frac{8\pi G\rho}{3}$$

$$\boxed{\dot{H} = \pm 4\pi G\dot{\phi}V_{SQ}}$$

$$\dot{\phi}\ddot{\phi} = -(1-\dot{\phi}^2)F(H,\dot{\phi},V,V_{SQ})$$

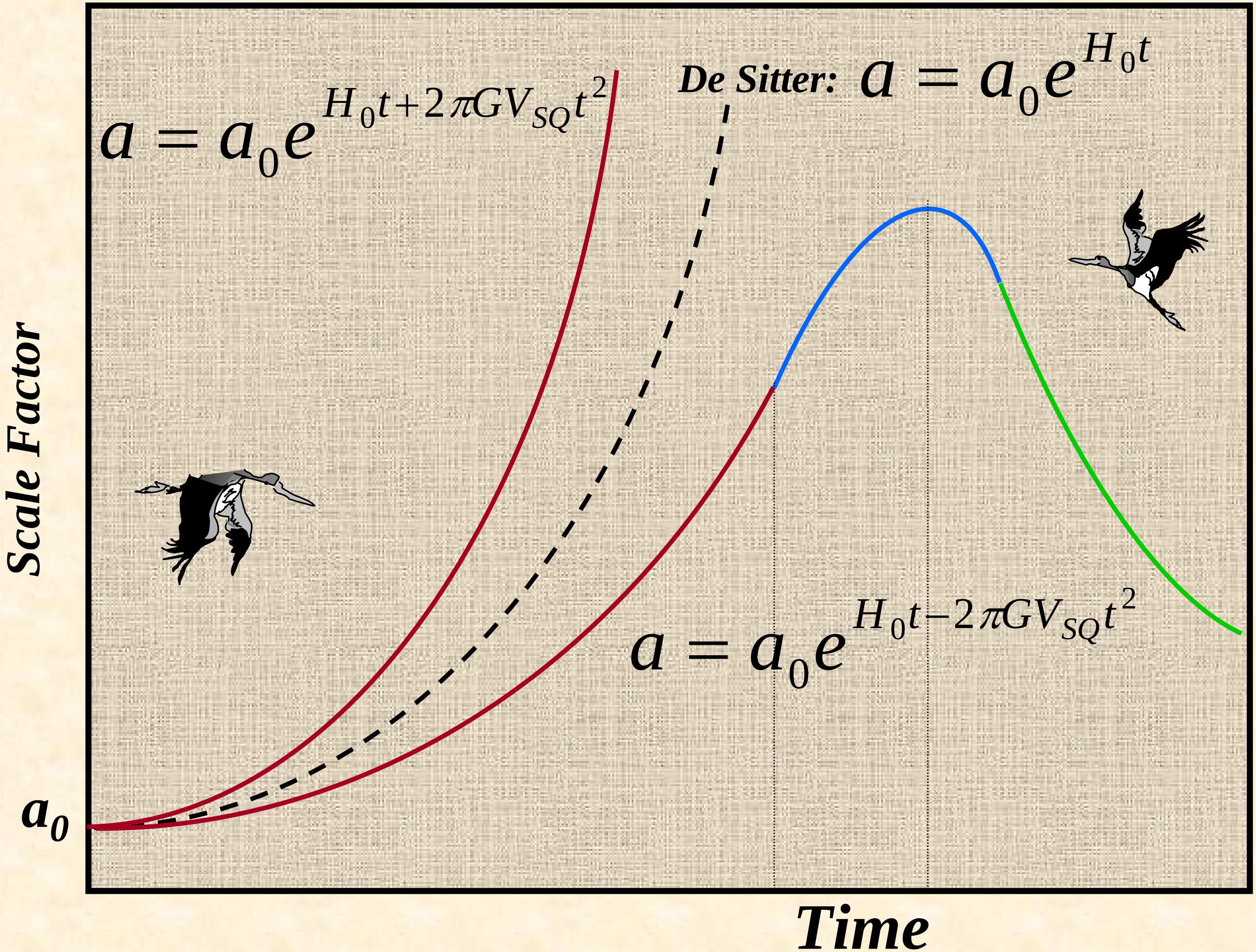
Finite: $\dot{\phi}^2 = 1$

Infinite: $\dot{\phi}^2 \neq 1$

$$V(\phi) = 0$$

$$\boxed{H = \pm 4\pi G V_{SQ} t + H_0}$$

Soluciones Sub-Cuánticas



Benign Phantom Model:

- *w < -1 but very close to -1*
- *Positive kinetic term*
- *No big rip singularity*
- *Increasing energy density*
- $V_{SQ} \to 0 \Rightarrow$ *De Sitter*
- *Dominant energy condition:* $p + \rho = \pm V_{SQ}$
- *Compatible with Matter Dominance*

There is not dark energy but just quantum effects of the CMB particles