

Audible Axions

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-Dynamics



to appear soon

-Phenomenology
-Axion Discovery Potential

Axion ϕ + Misalignment Mechanism

Pseudo Goldstone Boson

$$V(\phi) \sim m_\phi^2 f^2 (1 - \cos(\phi/f))$$

- ϕ homogeneous
- Displacement from

Minimum:

$$\phi = \Theta f, \quad \Theta \sim 1$$

$H > m$



-Pinned by
Hubble

$H < m$

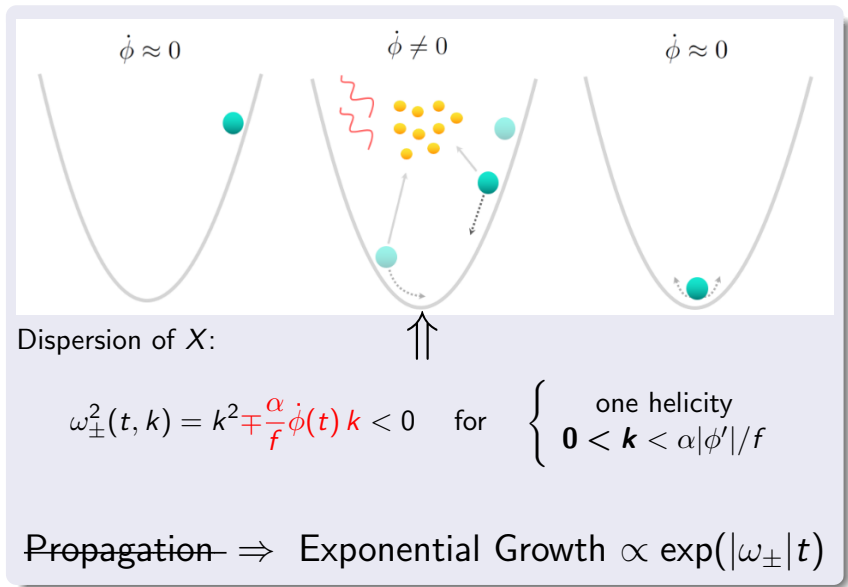


-Oscillates
-DM

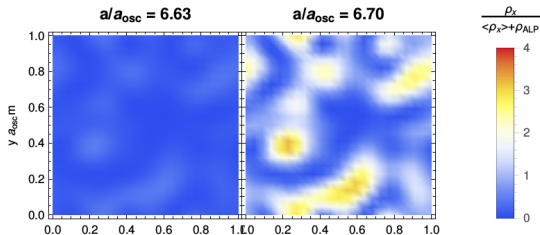
Dark Photon X + Coupling

$$\mathcal{L} \supset -\frac{\alpha}{4f} \phi X_{\mu\nu} \tilde{X}^{\mu\nu}$$

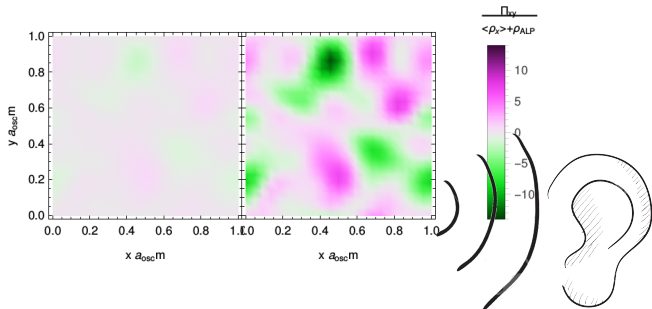
Production of Dark Photon



Energy Density
of Dark Photon

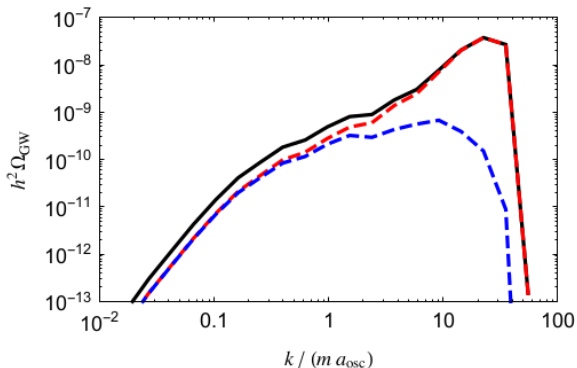


Anisotropic
Stress



Features of GW Spectrum

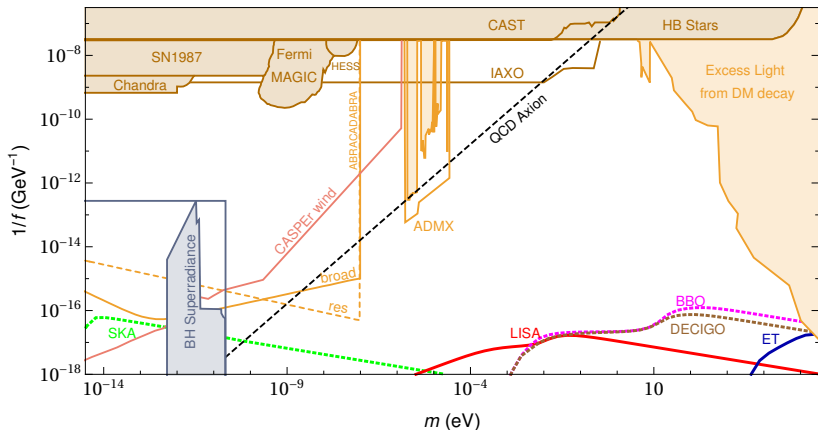
+ polarization, - polarization, total



-peaked

-(fully) polarized

Axion Discovery Potential



↑ Decay Constant f

$$\text{Source Strength } \Omega_\phi \approx \left(\frac{f}{m_{pl}} \right)^2$$

↑ Axion Mass m

Mass \Leftrightarrow Frequency \Leftrightarrow Detector



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more soon