

# Crescendo Beyond the Horizon

## More Gravitational Waves from Domain Walls Bounded by Inflated Cosmic Strings

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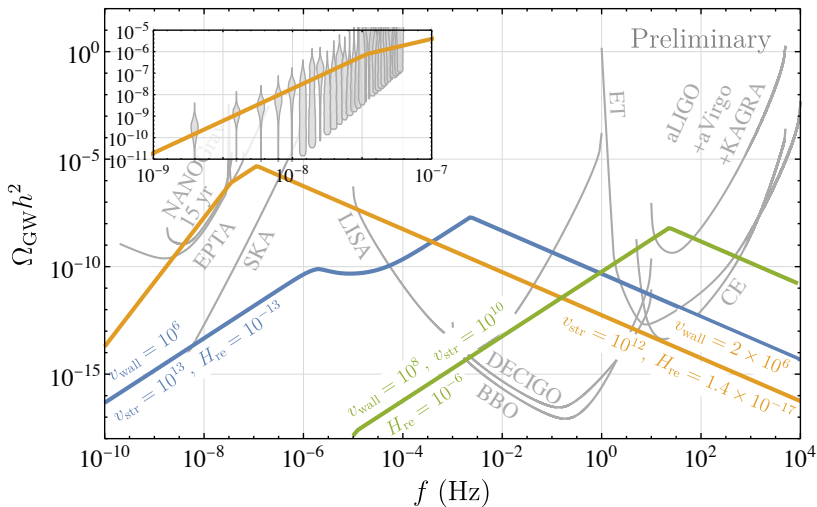
work in progress with Keisuke Harigaya and Lian-Tao Wang

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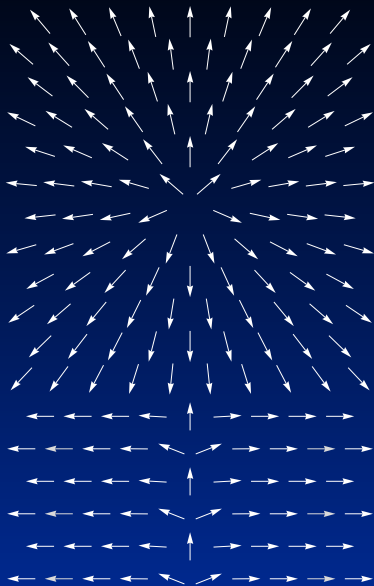
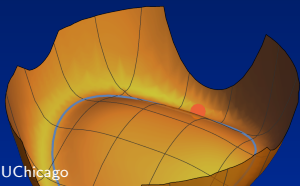
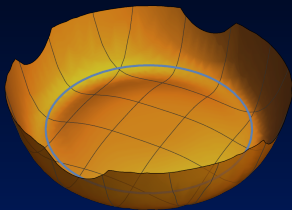
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# Benchmark GW Spectra



# Cosmic Strings and Domain Walls



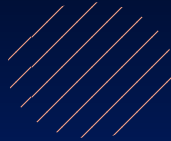
# Energy of Domain Walls and Cosmic Strings

cosmic string



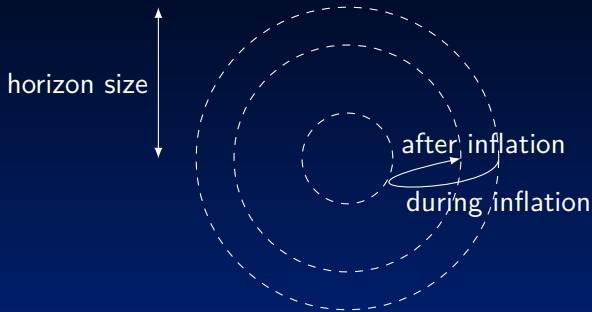
$$E_{\text{str}} \sim \mu L, \quad [\mu] = 2, \quad (2)$$

domain wall

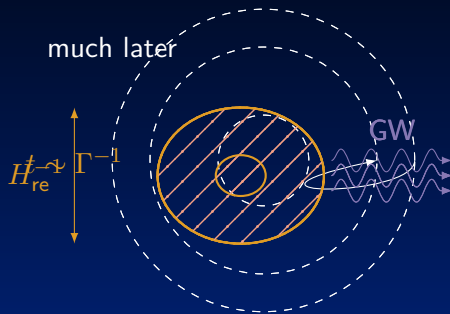


$$E_{\text{wall}} \sim \sigma L^2, \quad [\sigma] = 3. \quad (3)$$

# Inflation Shrinks Horizon



# Inflated String-bounded Wall



# Timescales in Evolution of Strings and Walls

$$[\mu] = 2, \quad [\sigma] = 3$$

$$\Gamma_{\text{str}} \sim \frac{\mu H_{\text{re}}}{M_{\text{Pl}}^2} \quad (4)$$

$$\Gamma_{\text{wall}} \sim \frac{\sigma}{M_{\text{Pl}}^2} \quad (5)$$

# GW Spectral Peak

usual cosmic string

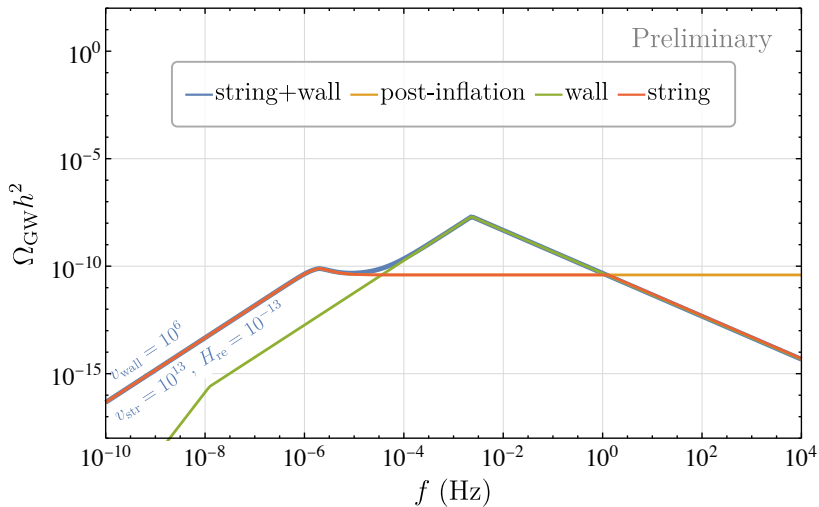
$$\Omega_{\text{GW}} h^2 \Big|_{\text{now}} \sim \Omega_{\text{rad}} h^2 \sqrt{\frac{\mu}{M_{\text{Pl}}^2}} \approx 4 \times 10^{-11} \left( \frac{\mu^{1/2}}{10^{13} \text{ GeV}} \right) \quad (6)$$

wall bounded by inflated string

$$\begin{aligned} \Omega_{\text{GW}} h^2 \Big|_{\text{now}} &\sim \Omega_{\text{rad}} h^2 \sqrt{\frac{\sigma}{M_{\text{Pl}}^2 H_{\text{re}}}} \\ &\approx 2 \times 10^{-8} \left( \frac{\sigma^{1/3}}{10^6 \text{ GeV}} \right)^{3/2} \left( \frac{10^{-14} \text{ GeV}}{H_{\text{re}}} \right)^{1/2} \end{aligned} \quad (7)$$



## Comparison



## Benchmarks

