

# Holographic Floquet Dynamics in Global AdS

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- What? (Floquet Dynamics?)

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- Why? (Motivation)

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- How? (AdS/CFT)

# What? (Floquet Dynamics?)

## Floquet Dynamics

System under a time-periodic perturbation

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## Floquet Dynamics

System under a time-dependent perturbation

Simple example: Kapitza pendulum

$$(x_0 = 0, y_0 = 0)$$

$$(x_0 = 0, y_0 = \epsilon \cos(\omega t))$$

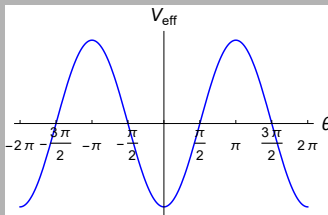
# Why? (Motivation)

Dramatically different Dynamics!

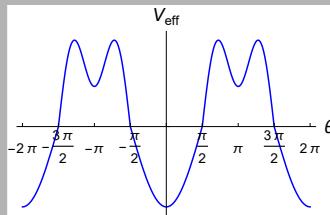


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(d)  $(x_0 = 0, y_0 = \epsilon \cos(\omega t))$

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- We can use Holography :)

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We are interested in non-equilibrium processes

Gravity  $\Leftrightarrow$   $QFT$  + Strong Coupling

AdS/CFT

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# How? (AdS/CFT)

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## Holographic Dictionary

Dynamical process  $\Rightarrow$  Non-equilibrium state

No Black Hole  $\Rightarrow$  Pure quantum state

Black Hole  $\Rightarrow$  Mixed quantum state

Transition NBH  $\rightarrow$  BH  $\Rightarrow$  Thermalization

$$S = \frac{1}{2\kappa} \int dx^4 \sqrt{-g} (R - 2\Lambda) - \int dx^4 \sqrt{-g} \left( \frac{1}{2} \partial_\mu \phi \partial^\mu \phi + m^2 |\phi|^2 \right)$$

- Dynamical evolution
- Construction of static solutions
- Construction of time-periodic solutions
- End points of instabilities  
(for example Black Hole formation)



# How? (AdS/CFT)

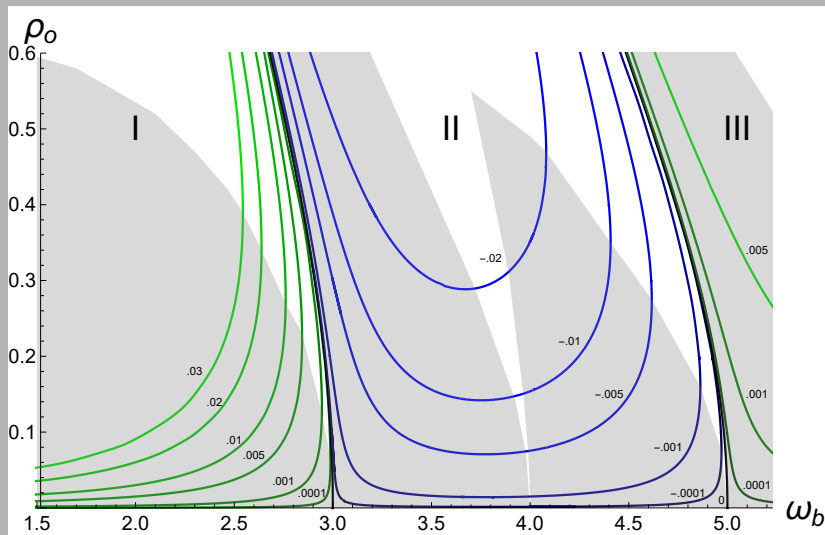
Holographic Dictionary:

- $\phi_b = 0 \Rightarrow$  Closed system ( $\dot{M} = 0$ )
- $\phi_b \neq 0 \Rightarrow$  Open System ( $\dot{M} \neq 0$ )

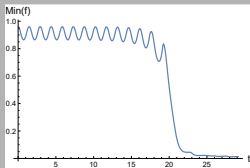
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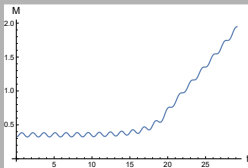
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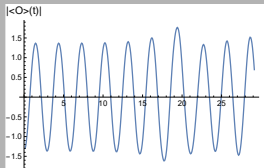
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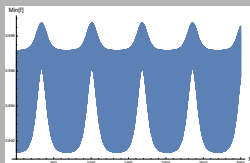
(e)



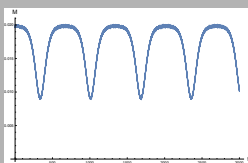
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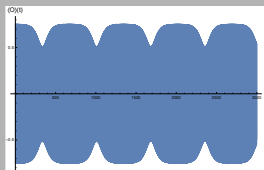
(g)



(h)



(i)



(j)

- We are interested in Floquet Quantum Systems at Strong Coupling
- Holographic Floquet Systems
- They present a rich phase space
- States with an emergent time periodicity

# Thanks!