Periodically driven many body systems

Bary theory Xmas Workshop *INFN*

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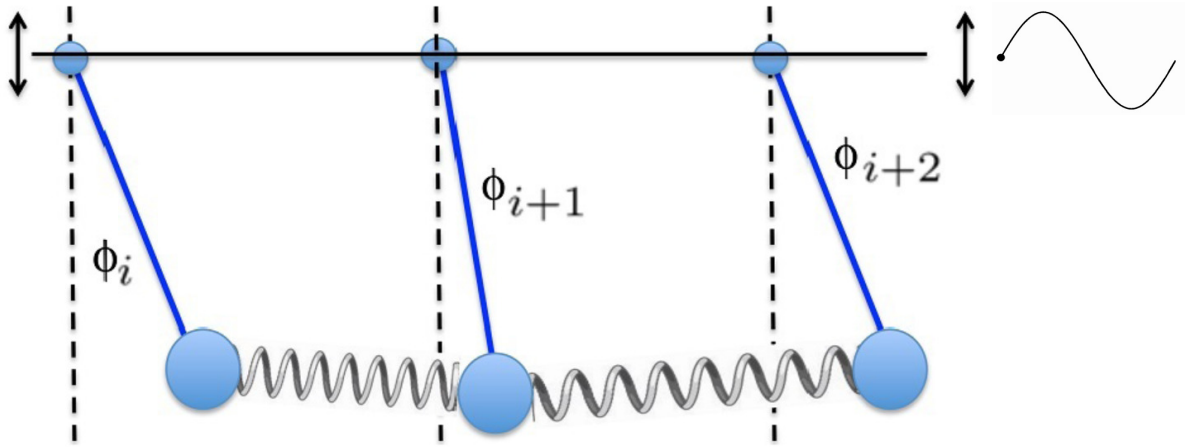
Introduction

- Periodic Hamiltonian
- External potential

→ energy behavior?



- Growth

or

- Localization

Intriguing problem in classical and quantum dynamics

Interacting Kicked rotors

Single kicked rotor

$$H(x,p,t) = \frac{p^2}{2} + K\cos x \sum_n \delta(t-n)$$

Integer times evolution

$$p_{n+1} = p_n + K\sin x_n$$
$$x_{n+1} = x_n + p_{n+1}$$

Near-integrable model

Kinetic energy localization

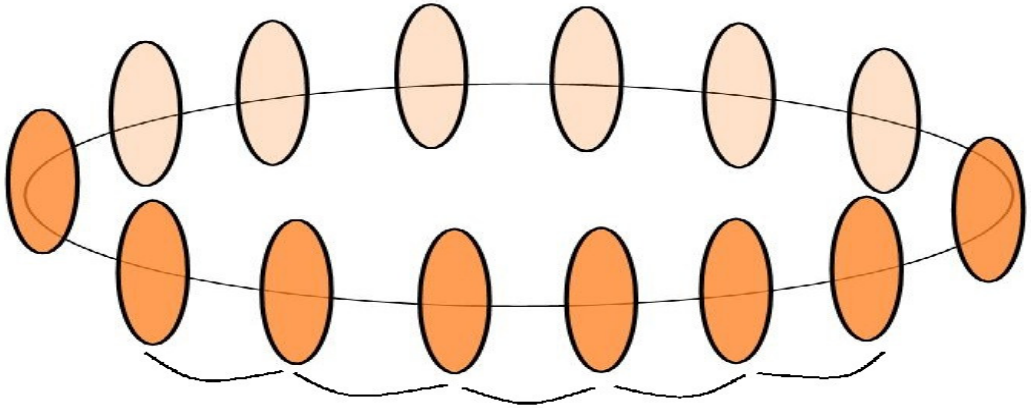
Chaotic behavior

Kinetic energy linear growth

$$D \sim \frac{K^2}{2} \qquad K >> 1$$

Interacting kicked rotors

Interaction term in the Hamiltonian



$$J \sum_{i=1}^{d} \cos(\theta_{i+1} - \theta_i)$$

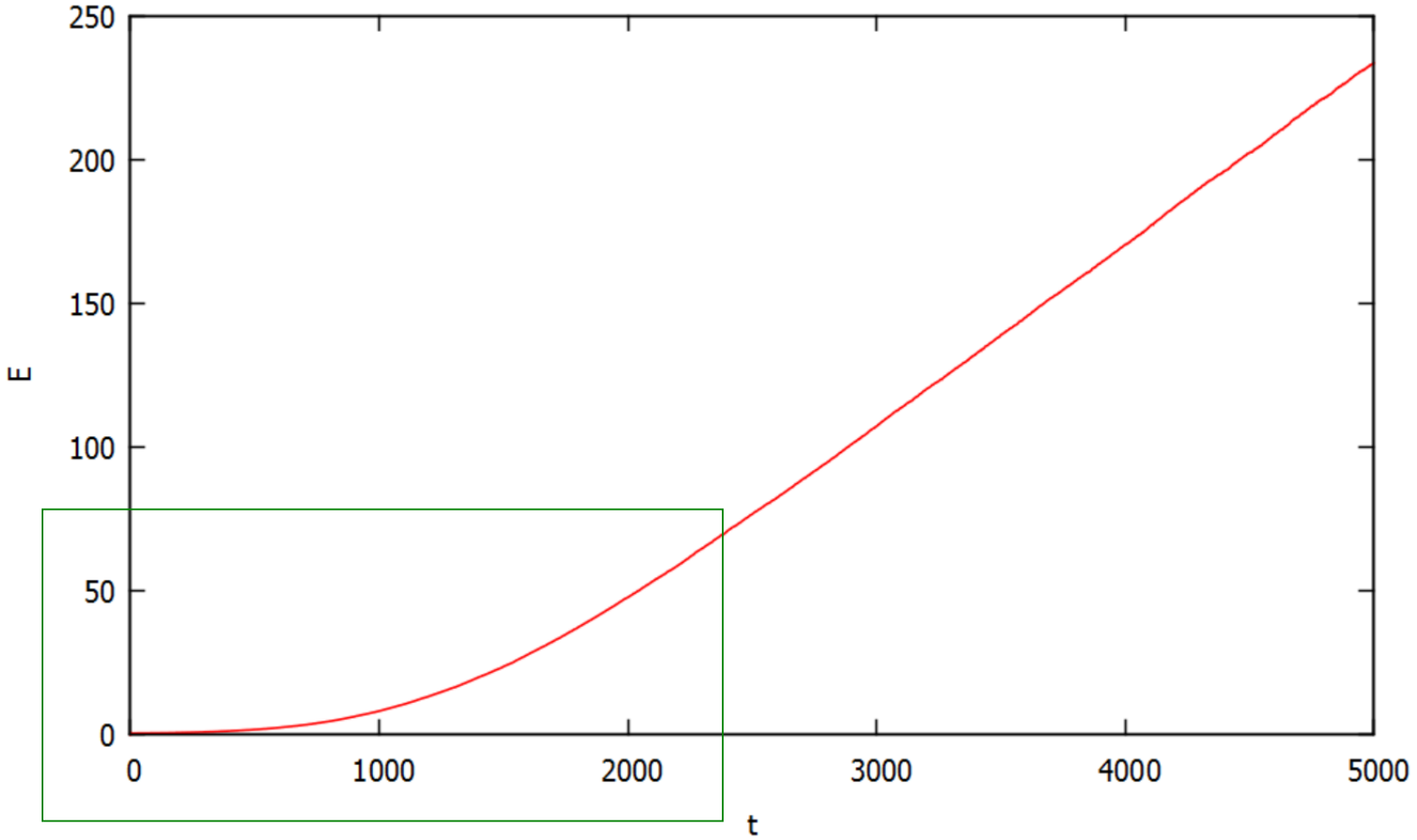
Expectation for kinetic energy linear growth:

$$D \sim \frac{K^2}{2} + J^2$$

0 < K < 1

J > 2

Interacting kicked rotors



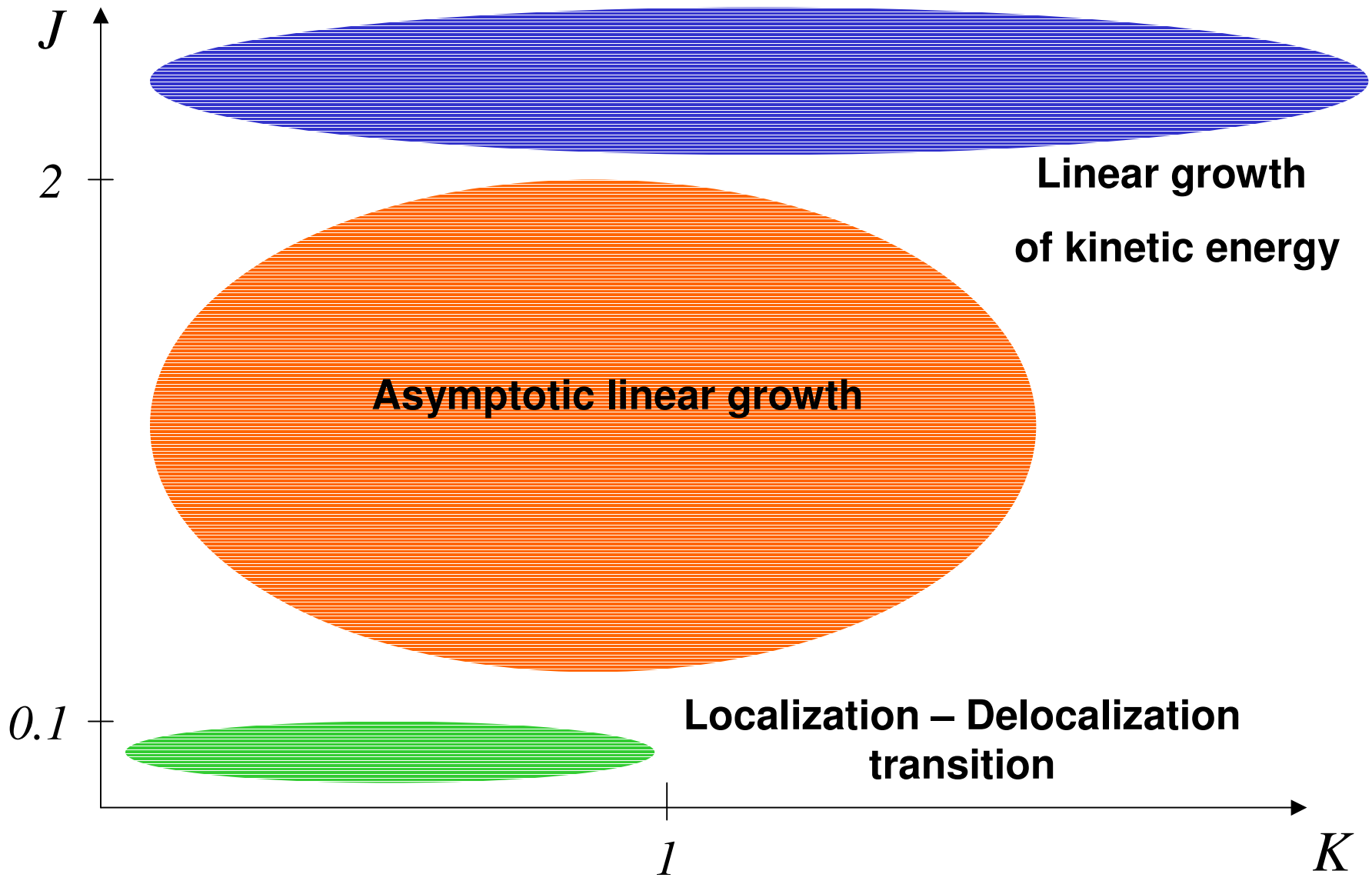
$K = 0.5$

$J = 0.4$

Disappearing for increasing J

Linear asymptotic behavior

K - *J* phase diagram



Thank you for your attention