Attenuation of soliton by thermal vibration and anomalous heat transport in the FPUT lattice
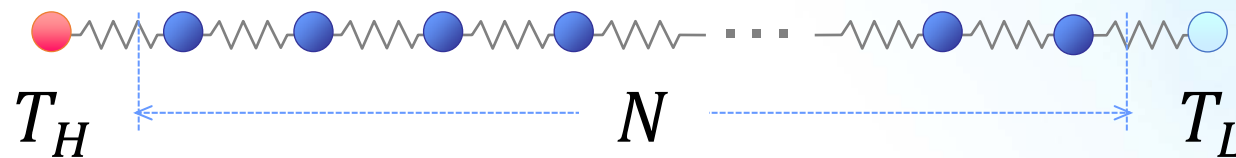
Kazuyuki Yoshimura*, Masaki Takatsu（Tottori Univ, Japan.）
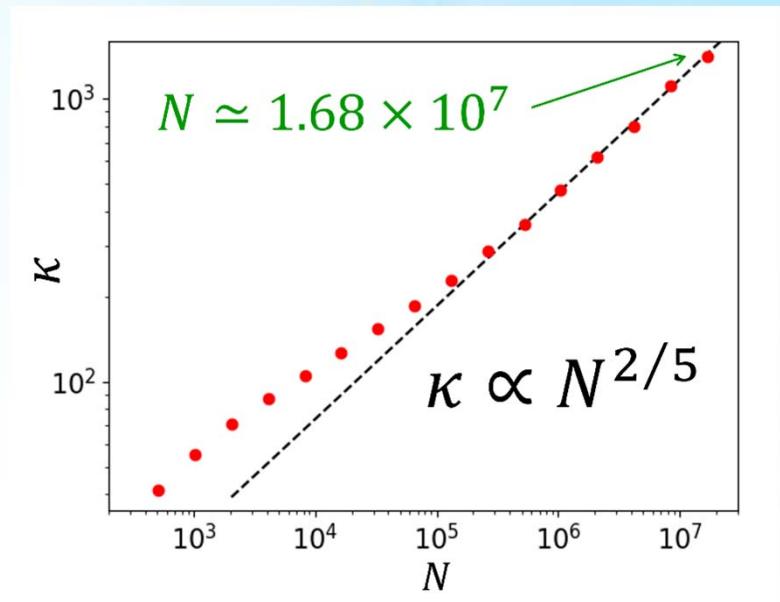
- Fermi-Pasta-Ulam-Tsingou (FPUT) -β lattice

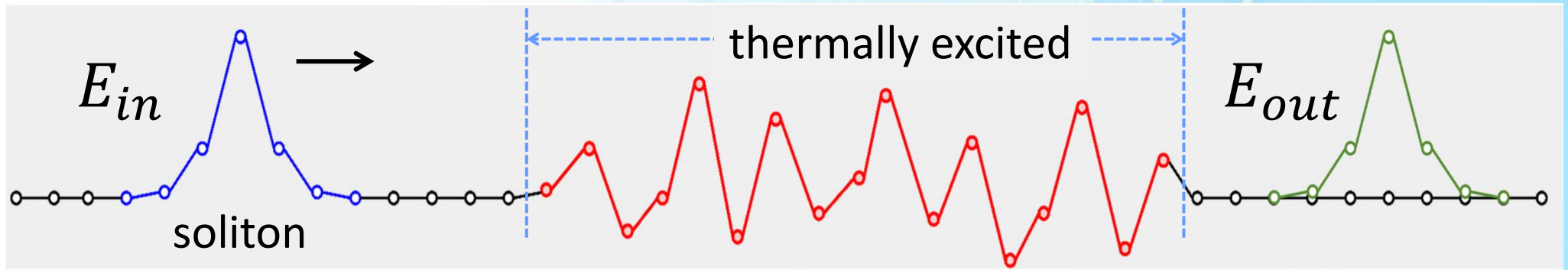$$V(r) = \frac{1}{2}r^2 + \frac{\beta}{4}r^4$$

T_H $\quad\longleftrightarrow\quad$ N $\quad\longleftrightarrow\quad$ T_L

- ♦ Anomalous heat transport

$$\kappa \propto N^\alpha, \quad \alpha \simeq 0.4$$

$N \simeq 1.68 \times 10^7$

$\kappa \propto N^{2/5}$

- **Mechanism**
- **Soliton dynamics**

M. Takatsu et al., J. Phys. Soc. Jpn. **93**, 053001 (2024)

■ Numerical experiment

● **Power law of soliton energy decay rate:**

$$\frac{E_{in} - E_{out}}{E_{in}} \propto E_{in}^{c}, \quad c \simeq 1.62$$

■ Soliton transport theory

● **Scaling law of anomalous transport:**

$$\kappa \propto N^{\alpha}, \quad \alpha = 1 - \frac{1}{c} \simeq 0.383$$