

Active Macroscopic Fluctuation Theory

Tridib Sadhu

Tata Institute of Fundamental Research, Mumbai



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Sandeep Jangid



Kapil Sharma



Anweshika Pattanayak



Aman Kumbhakar



Soumyabrata Saha



Jitendra Kethepalli



Sabyasachi



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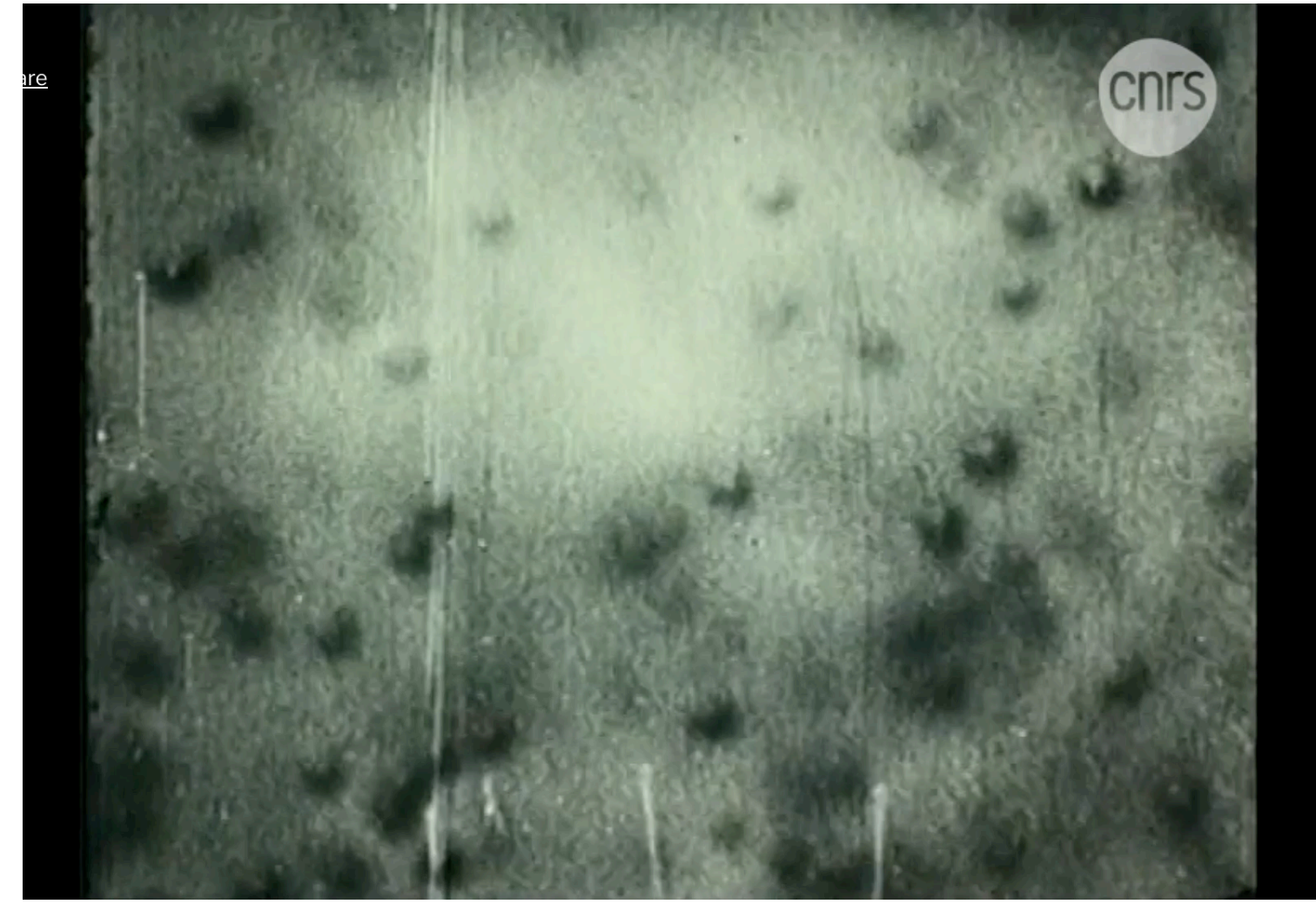
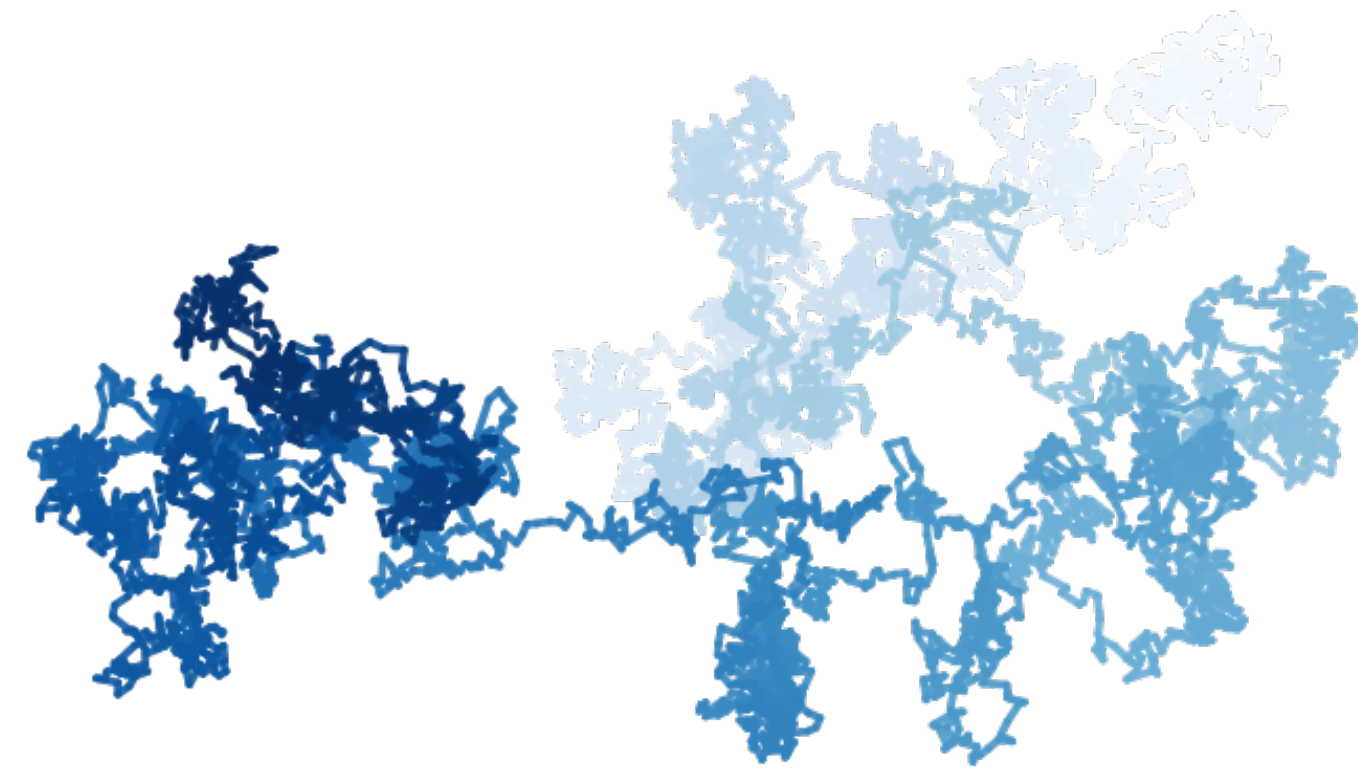
Sanjib Sabhapandit



Jacopo de Nardis

First: *Active matter*

Brownian Motion

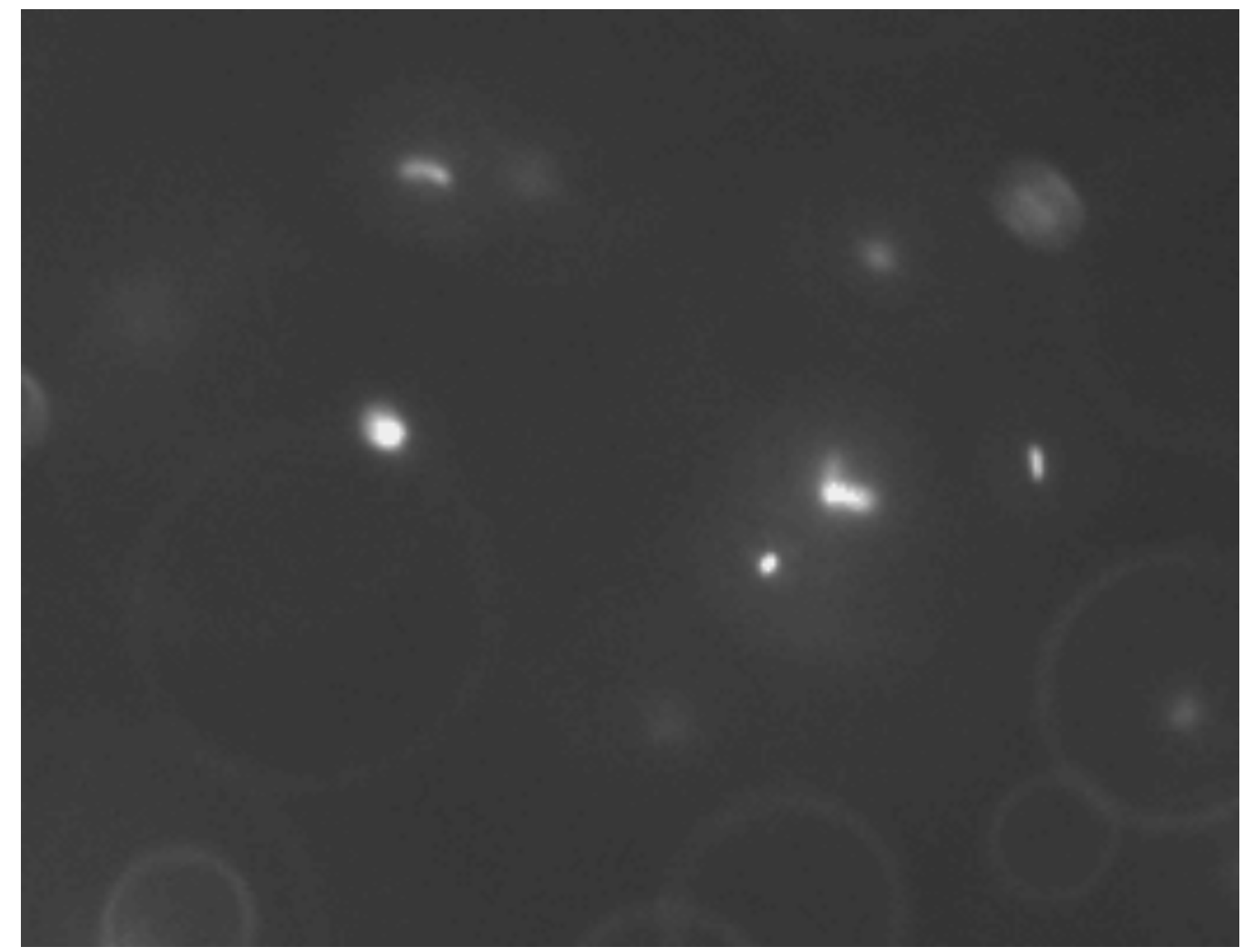
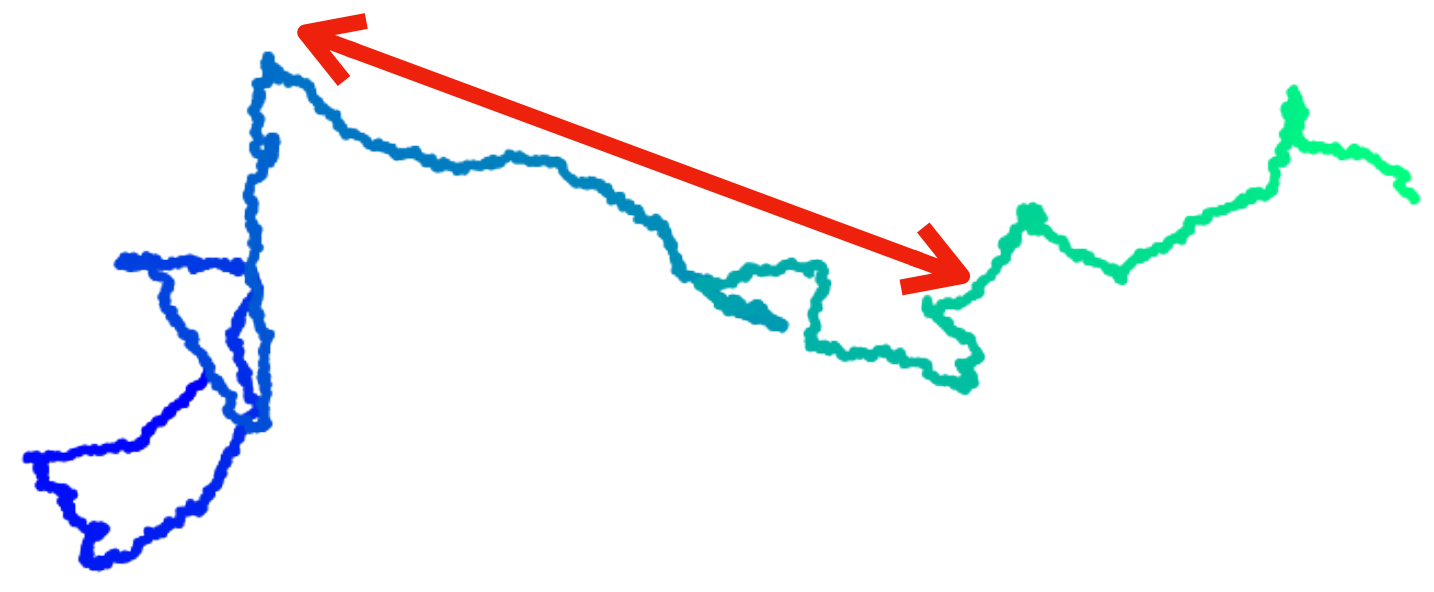


Expt of Paul Langevin (CNRS archive)

$$\dot{\mathbf{r}} = \mathbf{v}(t)$$

$$\langle v_i(t) v_j(t') \rangle = \delta_{ij} \delta(t - t')$$

Active particle

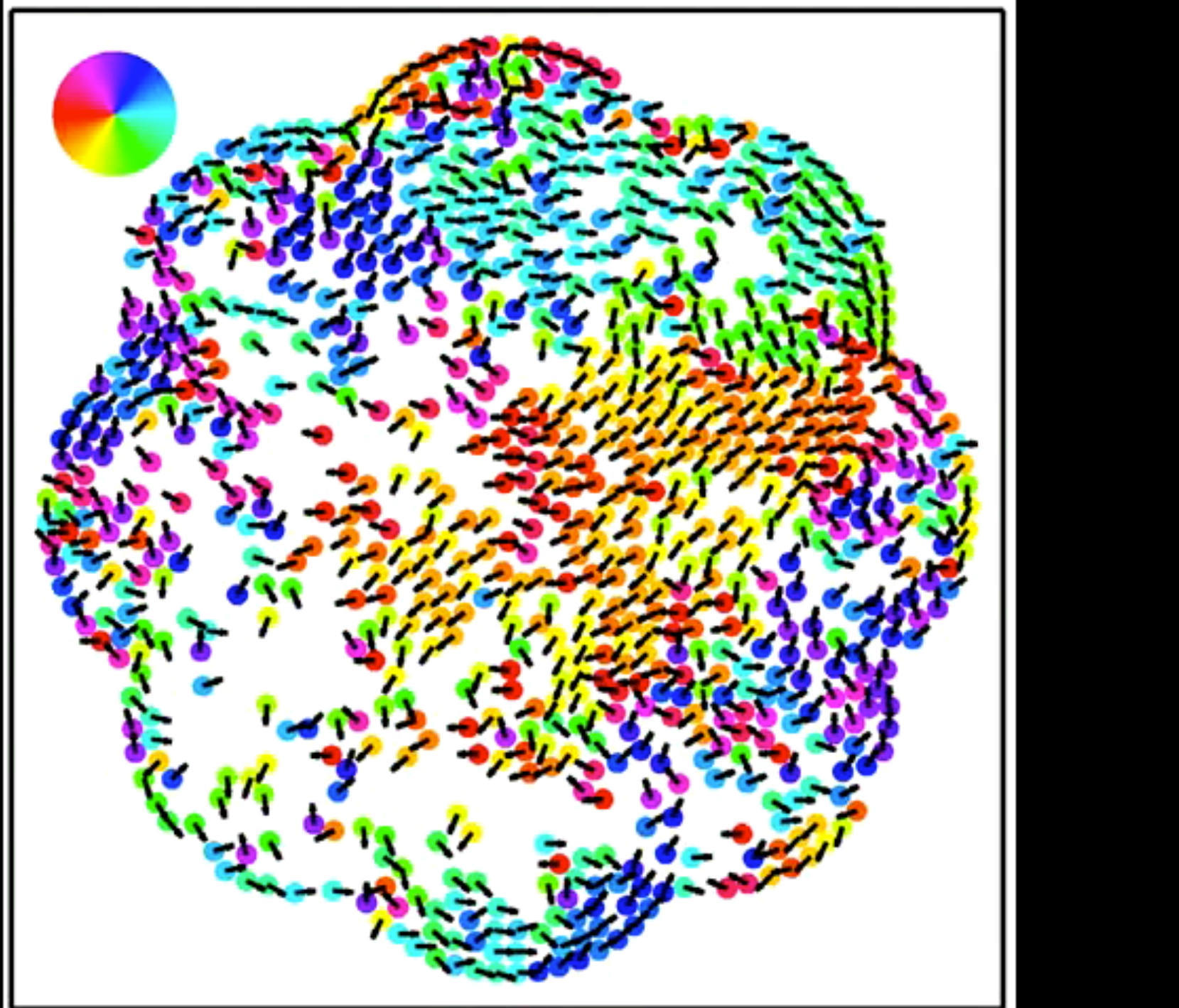


Courtesy: Mingming Wu, Cornell.

$$\langle v_i(t) v_j(t') \rangle = v_0 \delta_{ij} e^{-\frac{|t-t'|}{\tau}}$$

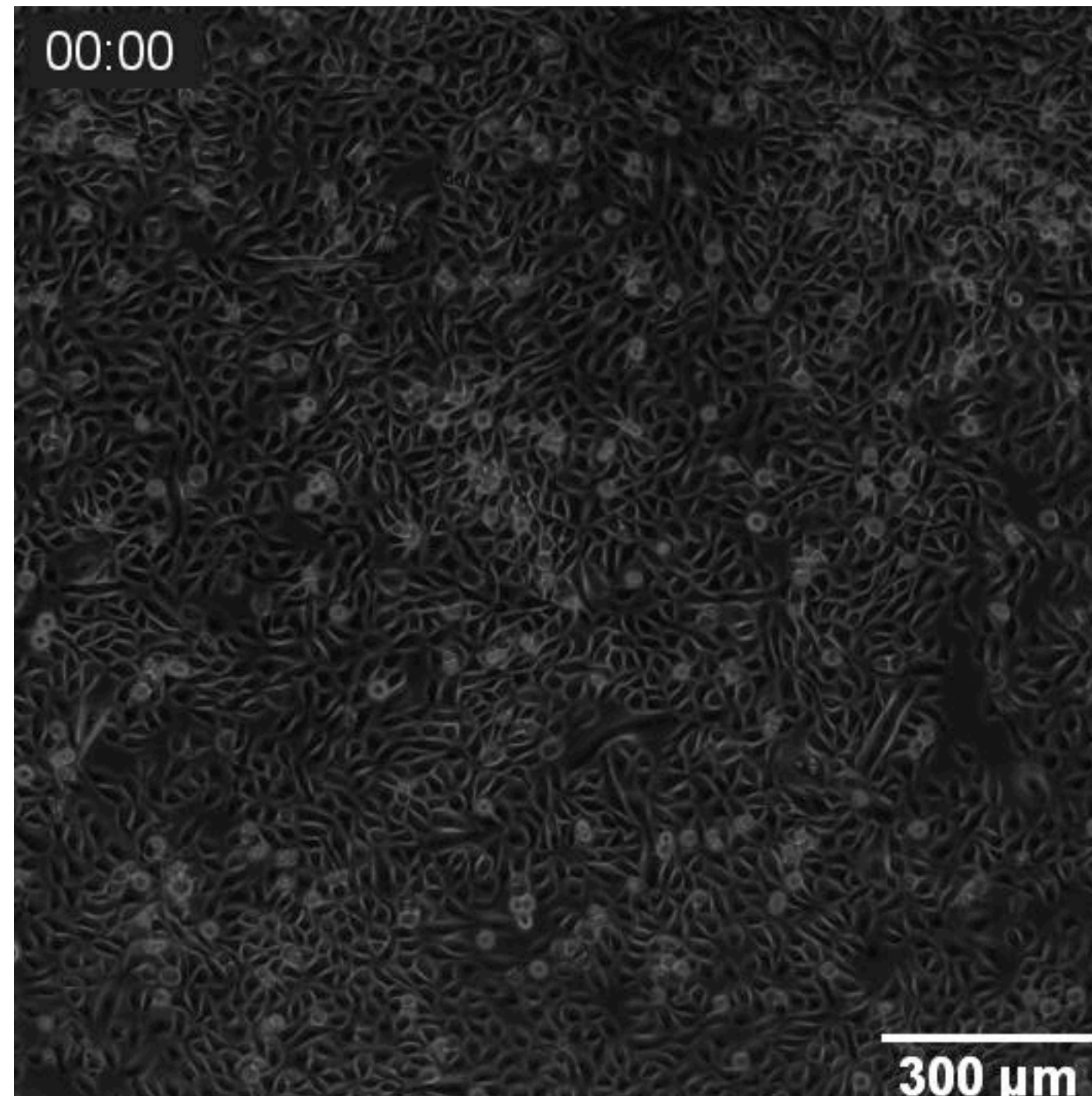
[Bechinger et al, RMP 88, 045006 (2016)]

Collective phenomena



[Deseigne, Dauchot, Chaté, PRL 105, 098001 (2010)]

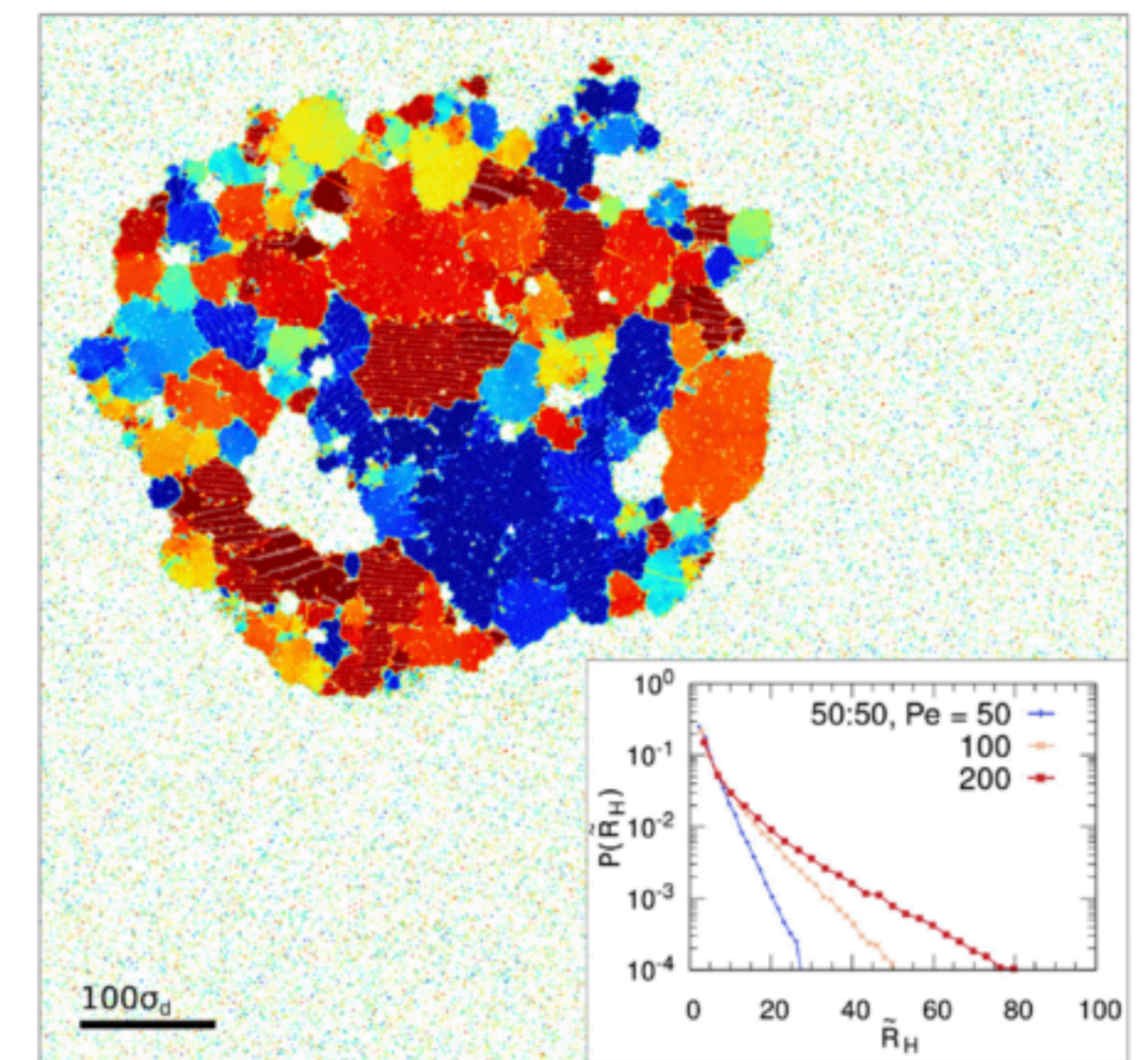
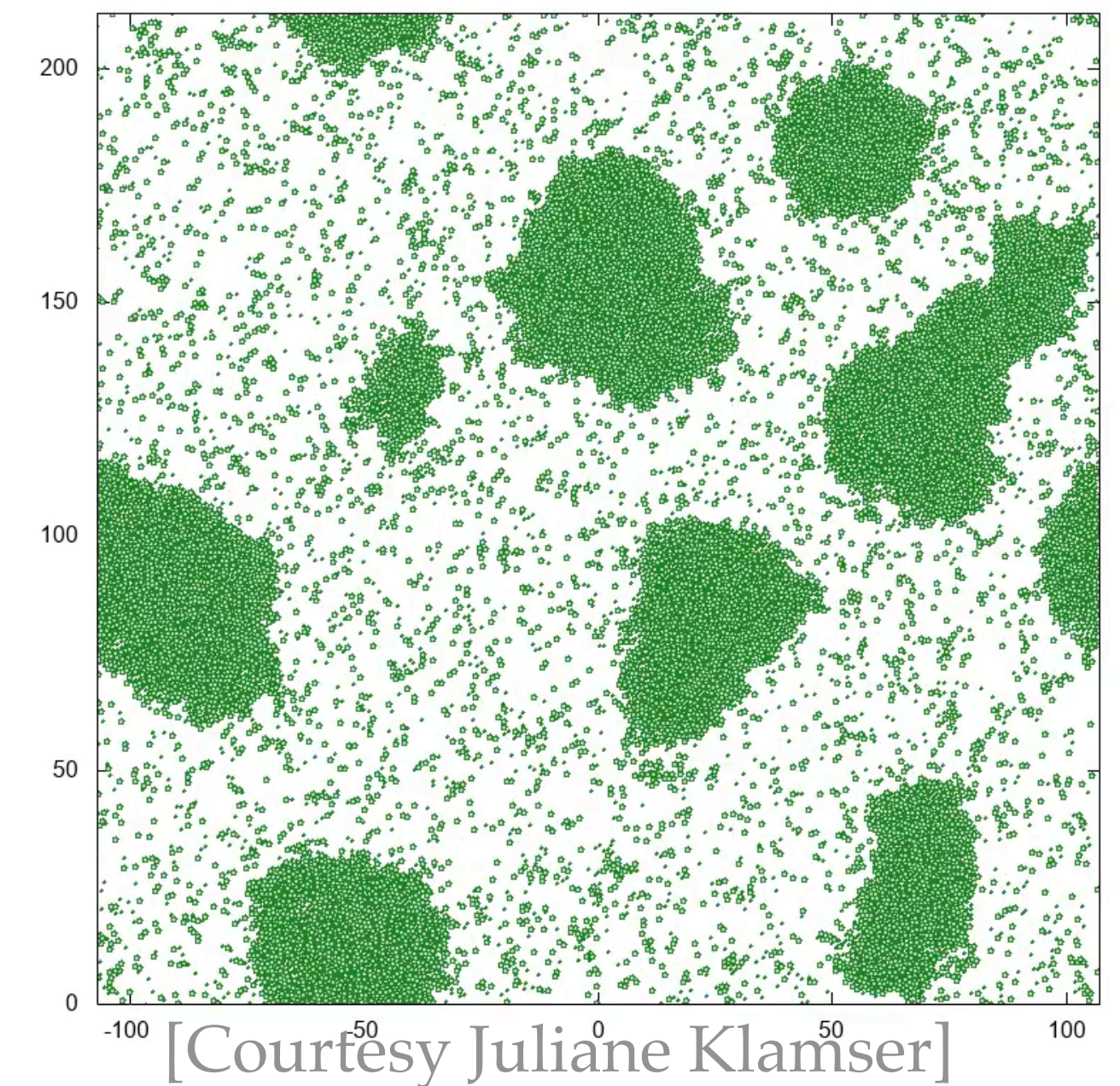
[Deseigne, Léonard, Dauchot, Chaté, Soft Matter (2012)]



[Blanch-Mercader, Yashunsky, Garcia, Duclos, Giomi, Silberzan, PRL 120, 208101 (2018)]

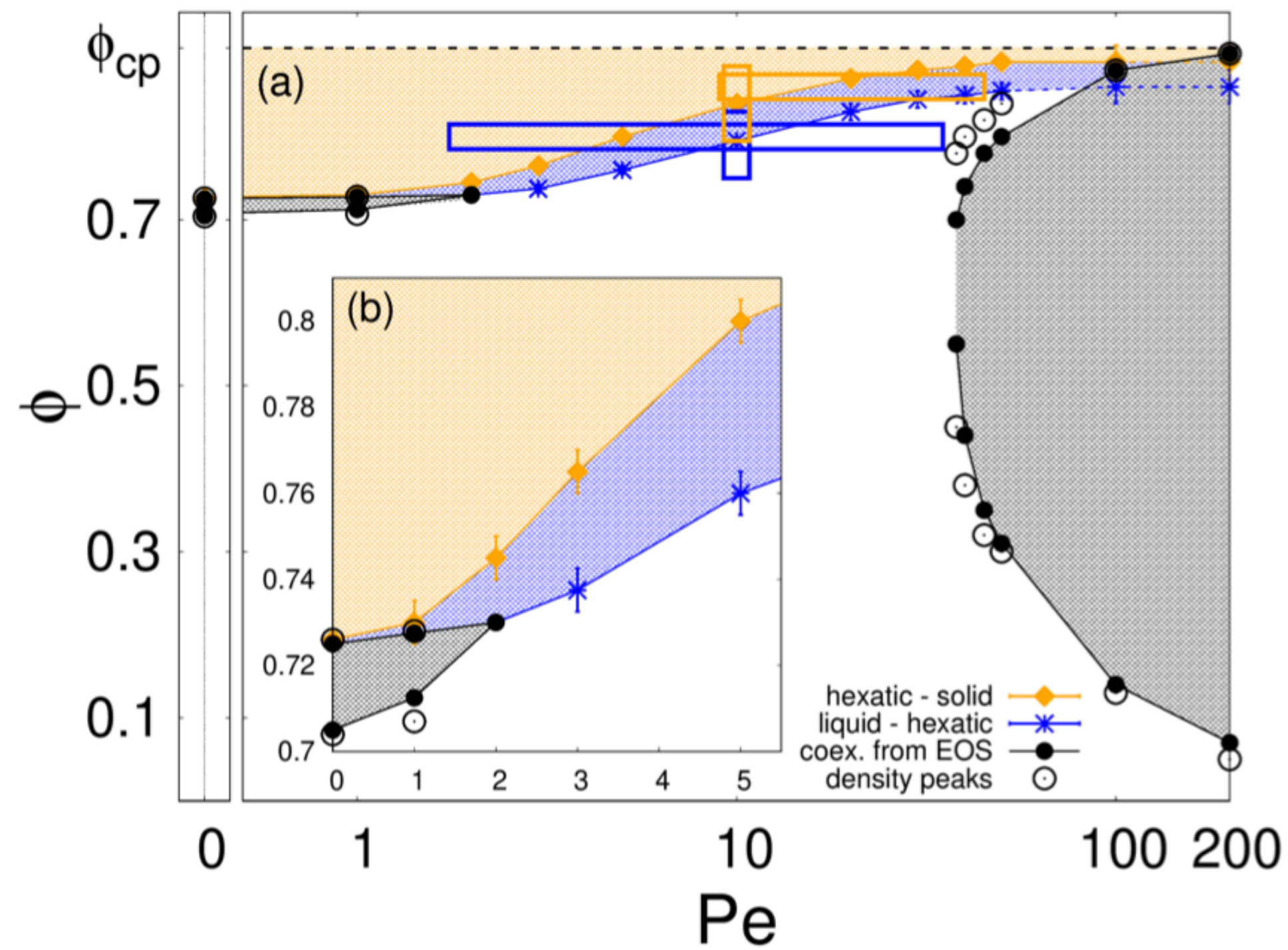
[Caporusso, Digregorio, Levis, Cugliandolo, Gonnella PRL 125, 178004 (2020)]

[Cugliandolo and Gonnella, Les Houches Lectures 2018]



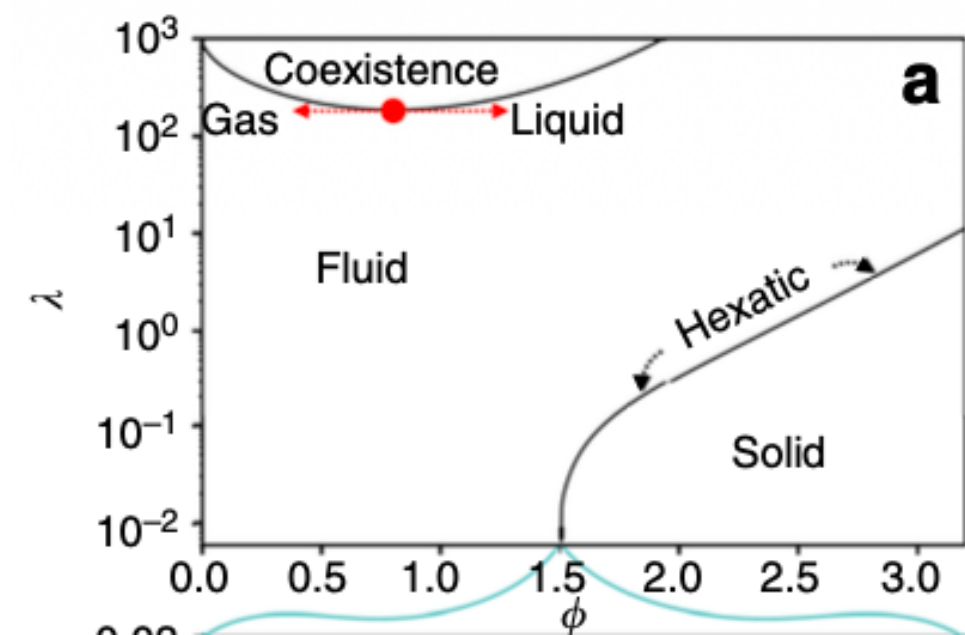
[Caporusso, Digregorio, Levis, Cugliandolo, Gonnella PRL 125, 178004 (2020)]

[Cugliandolo and Gonnella, Les Houches Lectures 2018]



Full phase diagram of Active Brownian discs

[Digregorio, Levis, Suma, Cugliandolo, Gonnella, Pagonabarraga PRL 121, 098003 (2018)]



[Klamser, Kapfer, Krauth Nat Com 9, 5045 (2018)]

Most theories are non-equilibrium extensions of Landau-Ginsberg type effective descriptions.

[Active field theories, Cates, Les Houches (2018)]

[Jülicher, Grill, Salbreux, Rep Prog Phys 81, 076601 (2018)]

[Bowick, Fakhri, Marchetti, Ramaswamy, PRX 12, 010501 (2022)]

[Marchetti, Joanny, Ramaswamy, Liverpool, Prost, Rao, Simha RMP 85, 1143 (2013)]

[Dinelli, O'Byrne, Tailleur, J Phys A 57, 395002 (2024)]

[Barré, Chetrité, Muratori, Peruani JSP 158, 589 (2015)]

[Bebon, Robinson, Speck, PRX 15, 021050 (2025)]

[Burekovic, Luca, Cates, Nardini, arXiv:2601.16539 (2026)]

[Supekar, Song, Hastewell, Dunkel, PNAS 120 (2023)]

Is there a quantitative macro-scale theory for Active matter, describing large fluctuations?

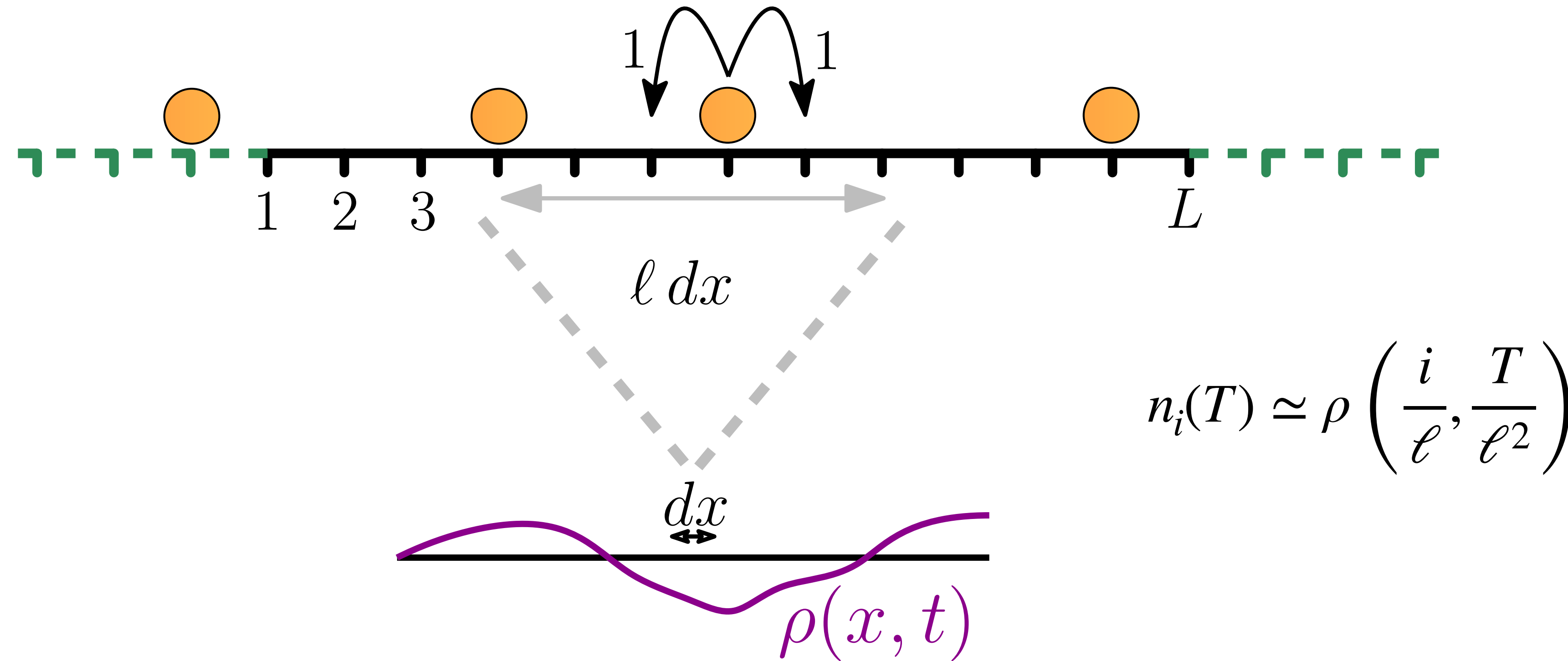
Knowledge from Passive systems:

Fluctuating hydrodynamics

&

Macroscopic fluctuation theory

Symmetric Simple Exclusion Process: Continuous time random walkers with hardcore exclusion



$$\partial_t \rho(x, t) = -\partial_x j(x, t); \quad j(x, t) = -\partial_x \rho(x, t) + \frac{1}{\sqrt{\ell}} \sqrt{2\rho(1-\rho)} \xi(x, t)$$

Fluctuating hydrodynamics

[Spohn (1991)]

[Kipnis,
Landim (1999)]

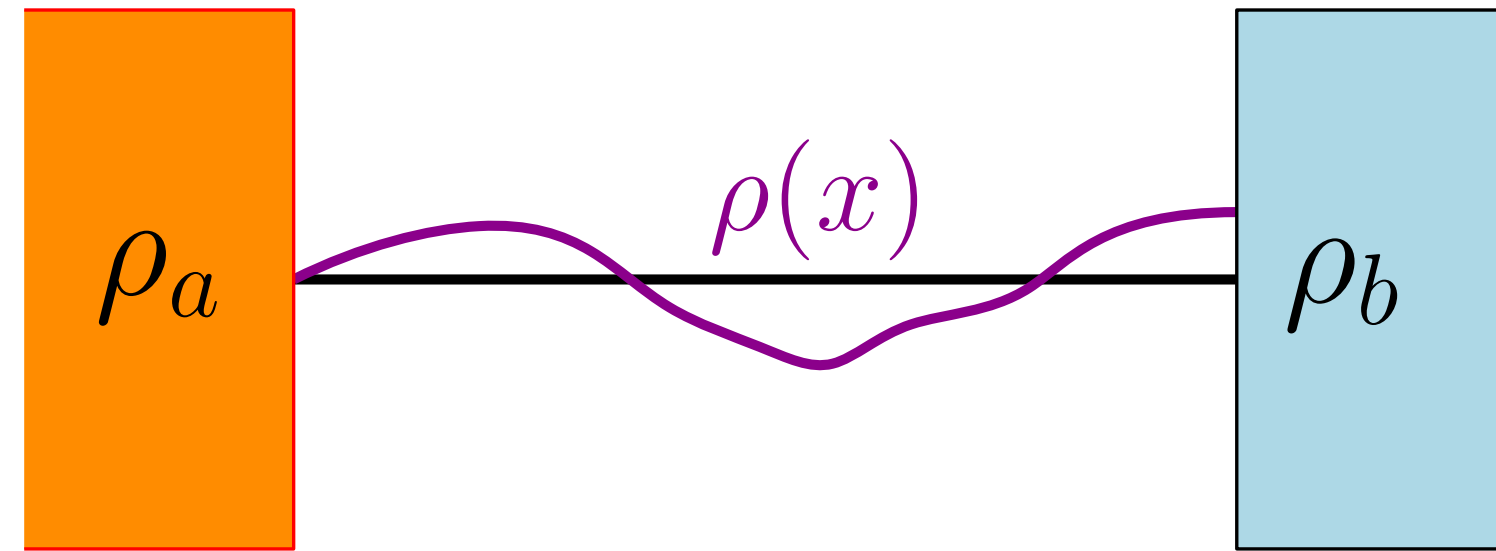
[Bertini, De Sole, Gabrielli, Jona-Lassinio, Landim
(PRL, 2000) (JSP 2002) (RMP 2015)]

[Tailleur, Kurchan, Lecomte,
(PRL 2007) (JPA 2008)]

What can the theory describe?

All macroscopic correlations
including large deviations!

Non-equilibrium stationary state



$$P[\rho(x)] \sim e^{-\ell \mathcal{F}[\rho(x)]}$$

Exact microscopic solution

[Derrida, Lebowitz, Speer (PRL, 2000) (JSP 2002)]

[Derrida, Hirschberg, TS (JSP 182, 15 (2020))]

Fluctuating Hydrodynamics

[Bertini, De Sole, Gabrielli, Jona-Lassinio, Landim
(PRL, 2000) (JSP 2002) (RMP 2015)]

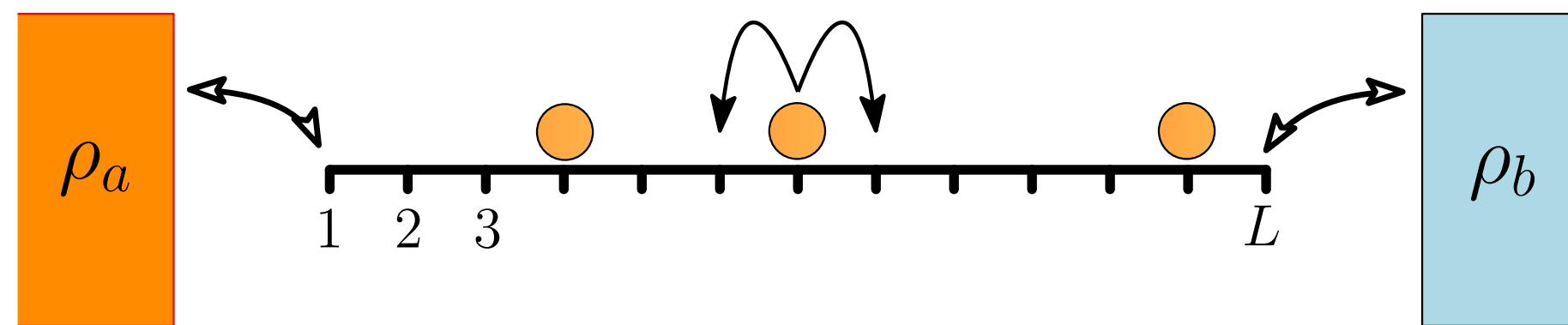
[Tailleur, Kurchan, Lecomte, (PRL 2007) (JPA 2008)]

[Saha, TS (Scipost Phys 17, 033 (2024))]

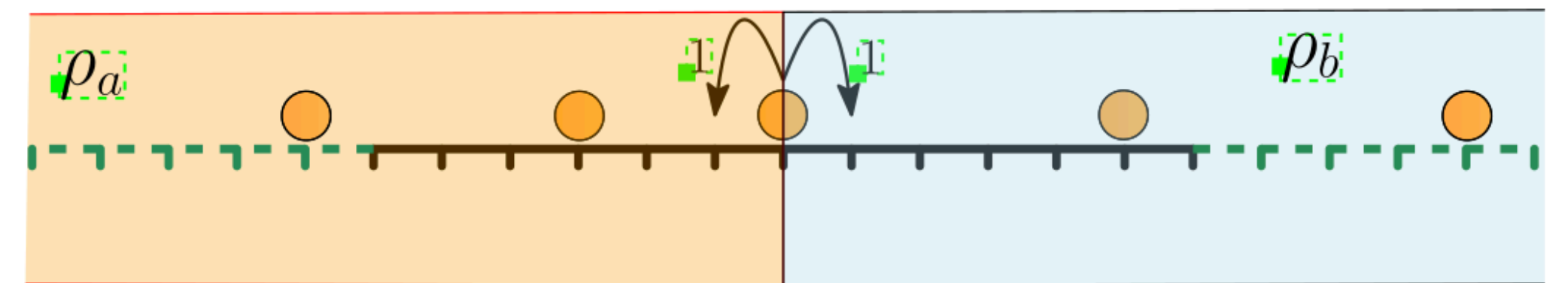
Fully characterises the Macroscopic state

Transport properties

Stationary state



Transient state



$$\langle e^{\lambda Q_t} \rangle \sim e^{-t^\alpha \mu(\lambda)} \text{ at large } t$$

[Derrida, Doucot, Roche (JSP, 2004)]

[Derrida, Bodineau (PRL, 2004)]

[Bertini, De Sole, Gabrielli, Jona-Lassinio, Landim (JSP, 2005)]

[Derrida, Hirschberg, TS (JSP 182, 15 (2020)]

[Saha, TS (Scipost Phys 17, 033 (2024)]

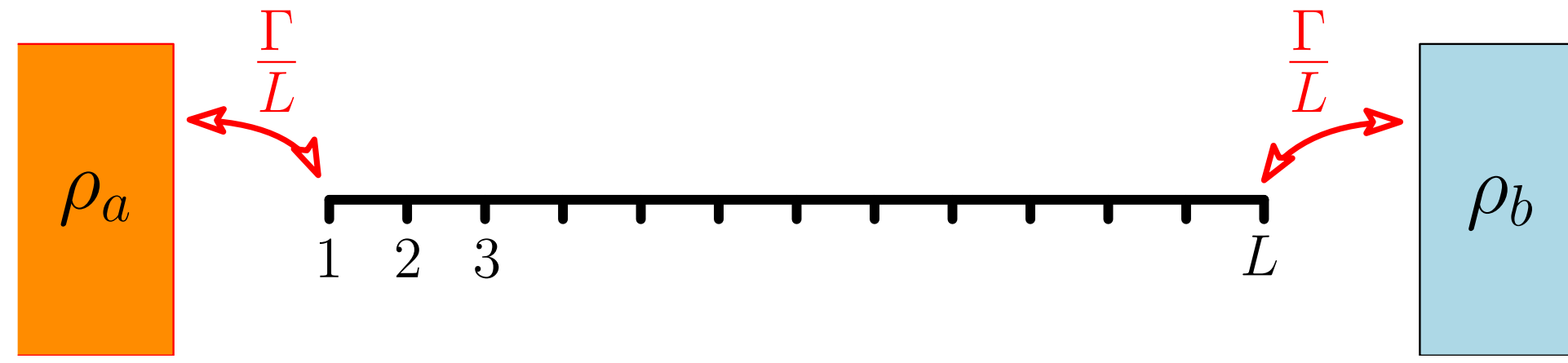
[Derrida & Gershenfeld (JSP 2009)]

[Mallick, Moriya, Sasamoto (PRL 2022)]

The Macroscopic approach has
the advantage of tractability

Transport properties

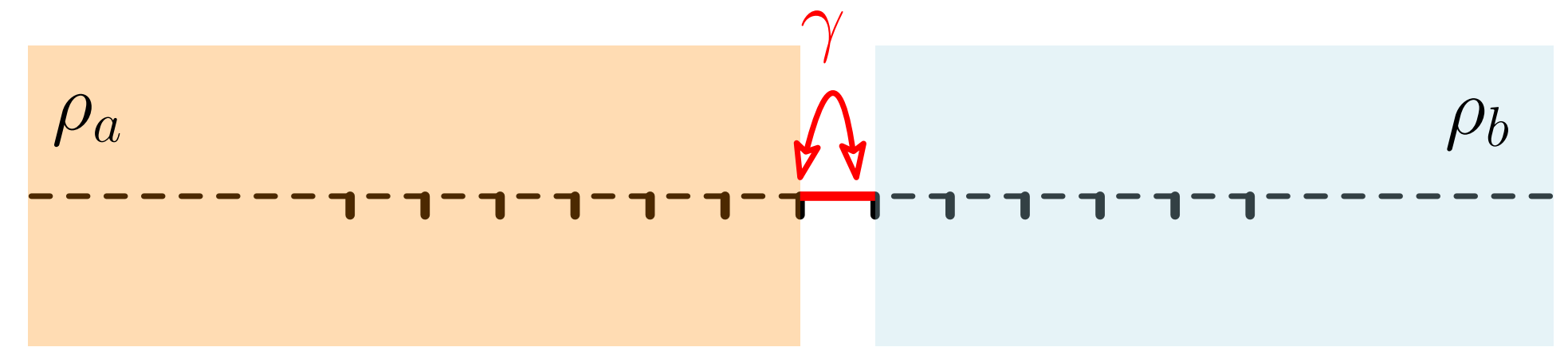
Slowly coupled SEP



[Saha, TS (Scipost Phys 17, 033 , 2024)]

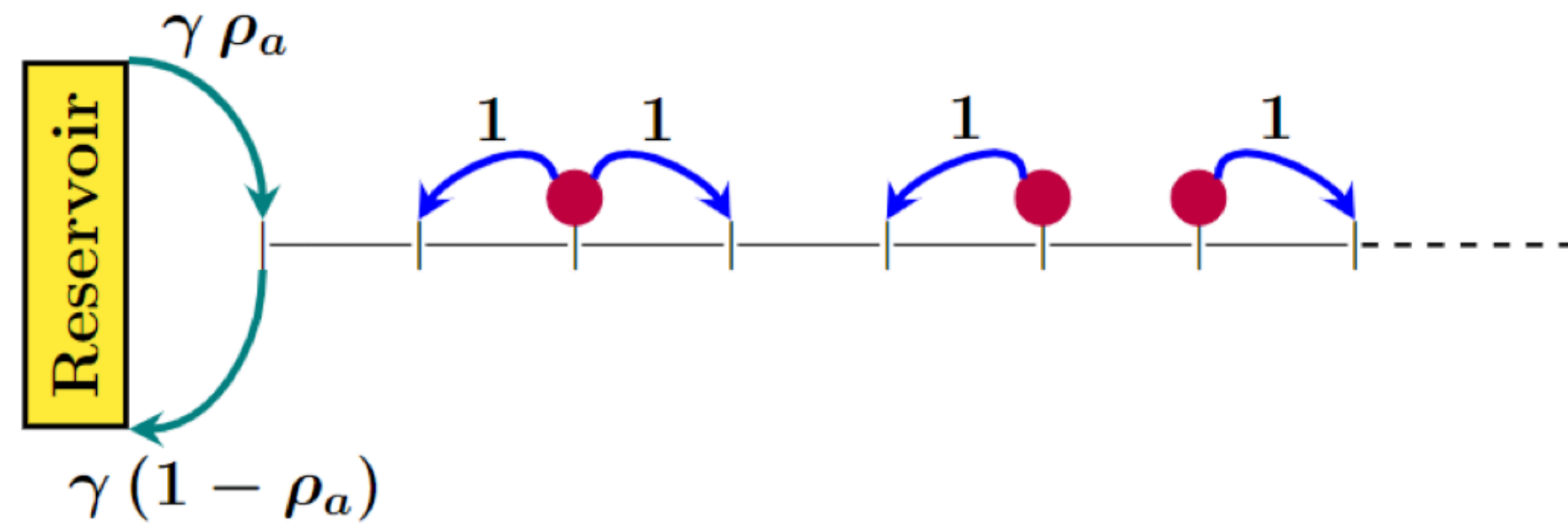
[Lazarescu (J Phys A 48, 503001 , 2015)]

Infinite SEP with slow region



[Sharma, Saha, Jangid, TS (PRE 2026)]

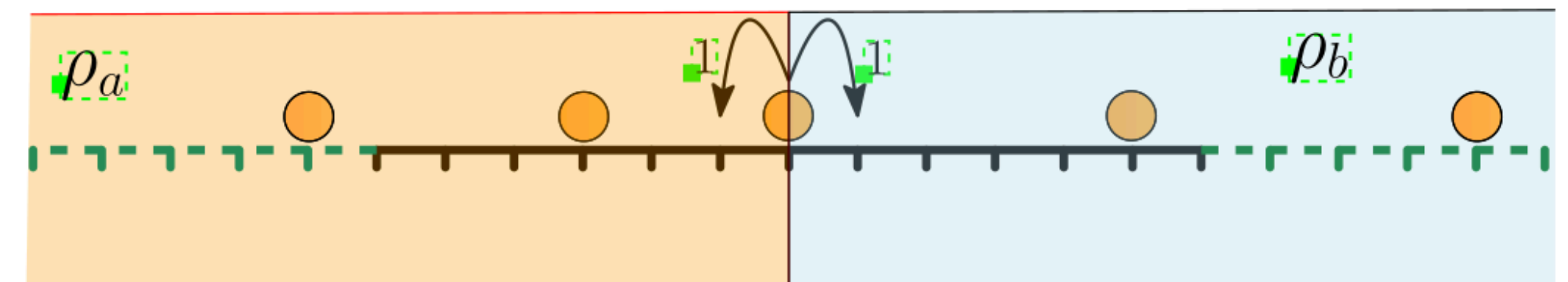
Semi-infinite SEP

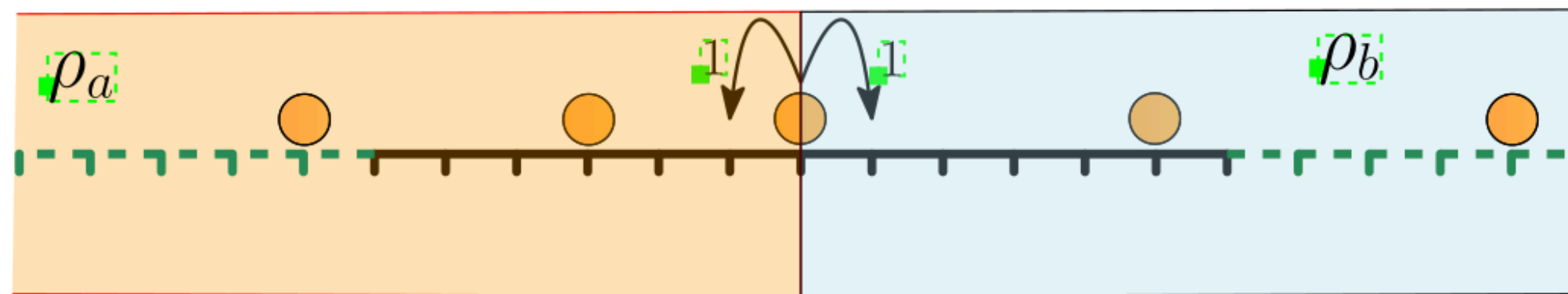


[Sharma, Saha, Jangid, TS (PRE 113, L052101 2026)]

[Grabsch, Moriya, Mallick, Sasamoto, Benichou (PRL 2024)]

Multi-time statistics in SEP





$$\langle e^{\lambda Q_t} \rangle \simeq e^{\sqrt{t} \chi(\lambda)}$$

[Derrida, Gershenfeld (JSP 2009)]

[Mallick, Moriya, Sasamoto (PRL 2022)]

$$\langle e^{\int_0^T dt \lambda(t) Q_t} \rangle \simeq e^{\mathcal{O}[\lambda(t) \partial_\kappa] \chi(\kappa) |_{\kappa=0}}$$

$$\mathcal{O}[z_t] = \sqrt{\pi} \int_{-\infty}^{\infty} dx \left(P(x,0) e^{-\Theta(x) \int_0^T dt z_t} - 1 \right)$$

$$\partial_t P(x, t) + \partial_x^2 P(x, t) = -z_t \Theta(x) P(x, t)$$

$$P[x, T] = 1$$

[Sharma, Chowdhury, Jangid, TS (upcoming)]

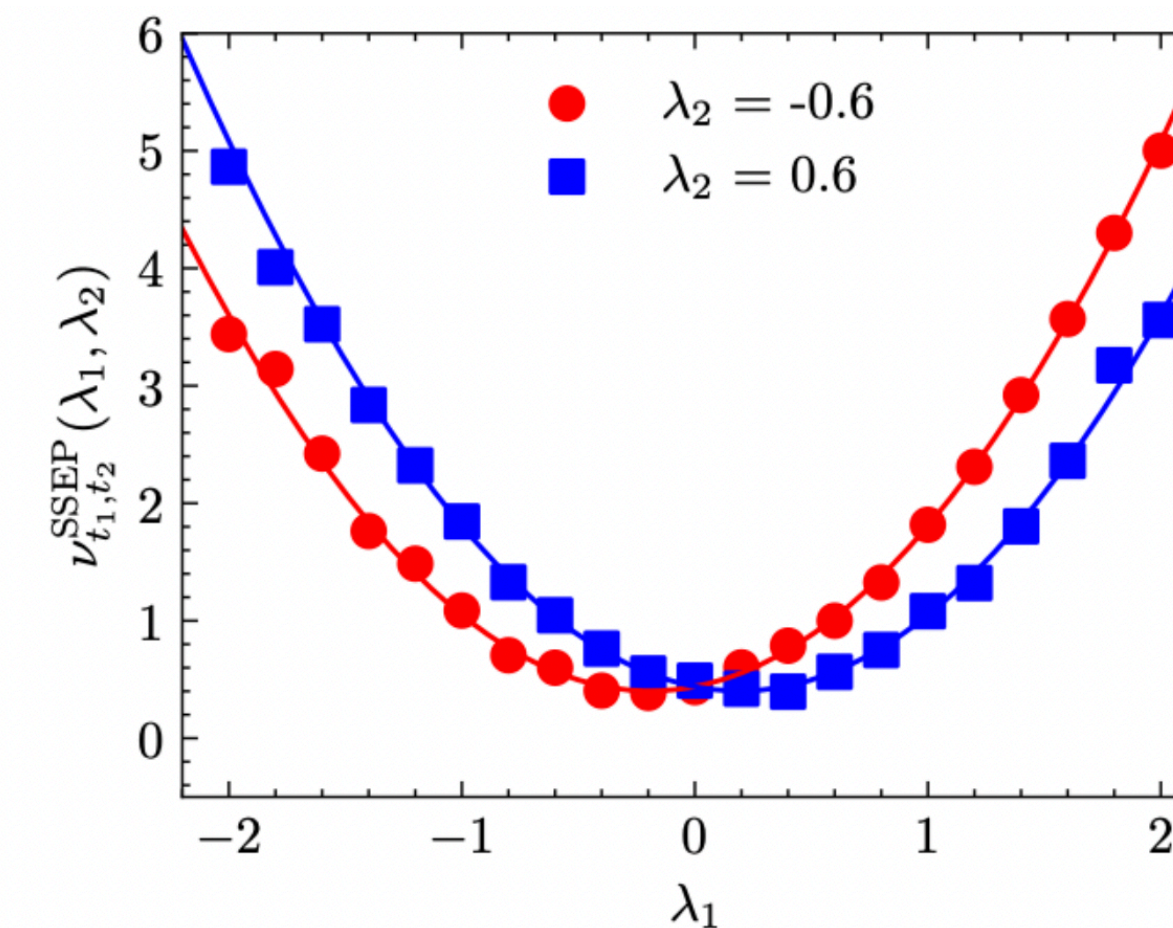


FIG. 1. **Two time SSEP** for $\rho_a = \rho_b = \frac{1}{2}$, parameters: N_c (clone populations) = 20000, $t_1 = 50$ and $t_2 = 125$

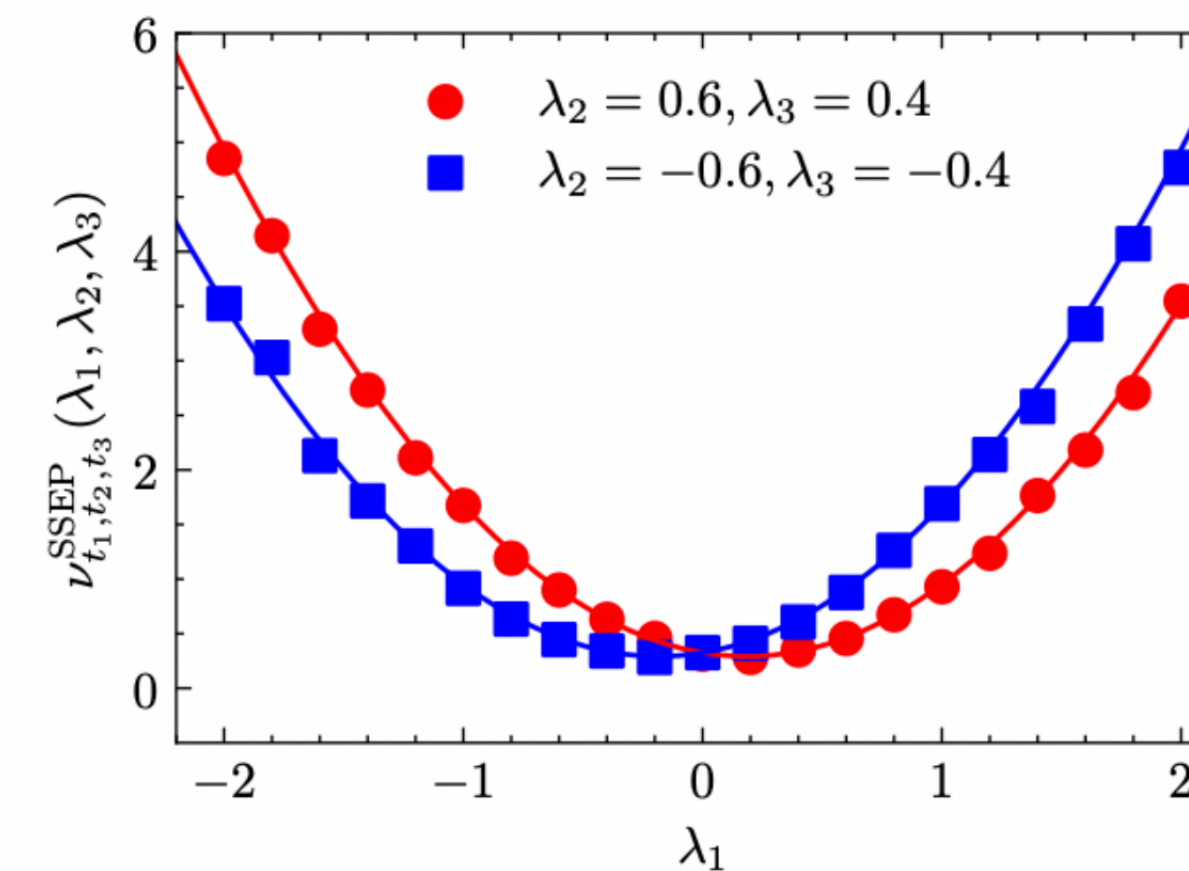
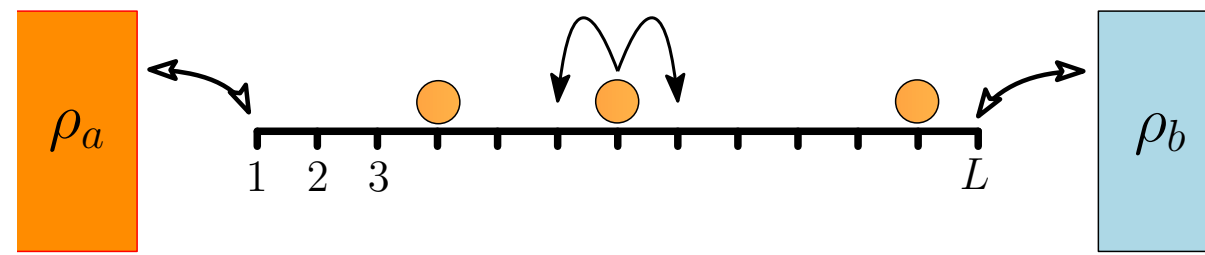


FIG. 2. **Three time SSEP** for $\rho_a = \rho_b = \frac{1}{2}$, parameters: N_c (clone populations) = 20000, $t_1 = 50$, $t_2 = 75$ and $t_3 = 150$

[Giardina,
Kurchan,
Peliti
(PRL
2006)]

Applications

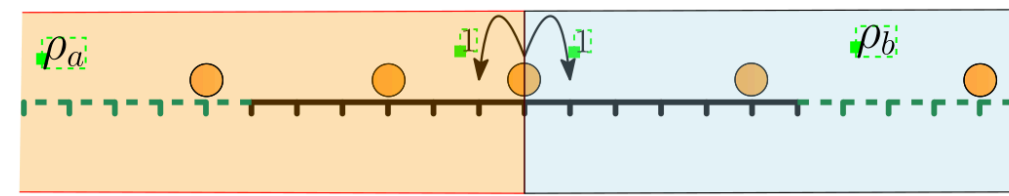
Finite SEP



Quantum Transport through disordered conductors.

[Lee, Levitov, Yakovets, (PRB 1995)]

Infinite SEP



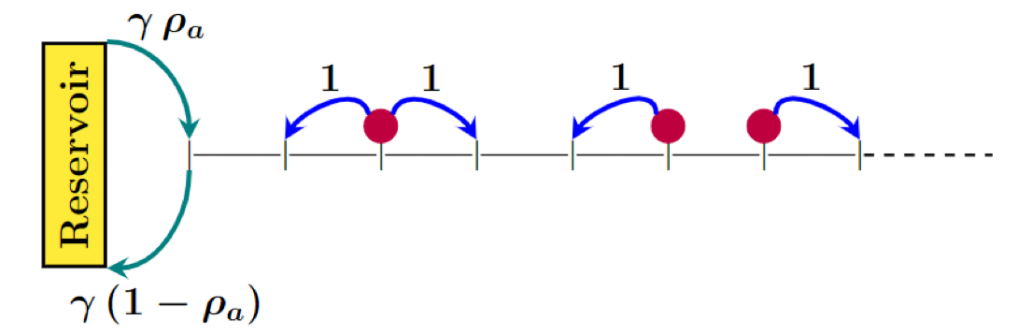
Random unitary quantum circuit

[McCulloch, Nardis, Gopalakrishnana, Vasseur (PRL 2023)]

Chaotic quantum dynamics

[Wienand, Vasseur, Gopalakrishnana, Bloch (Nat Phys 2024)]

Semi-Infinite SEP



Quantum Mpemba effect

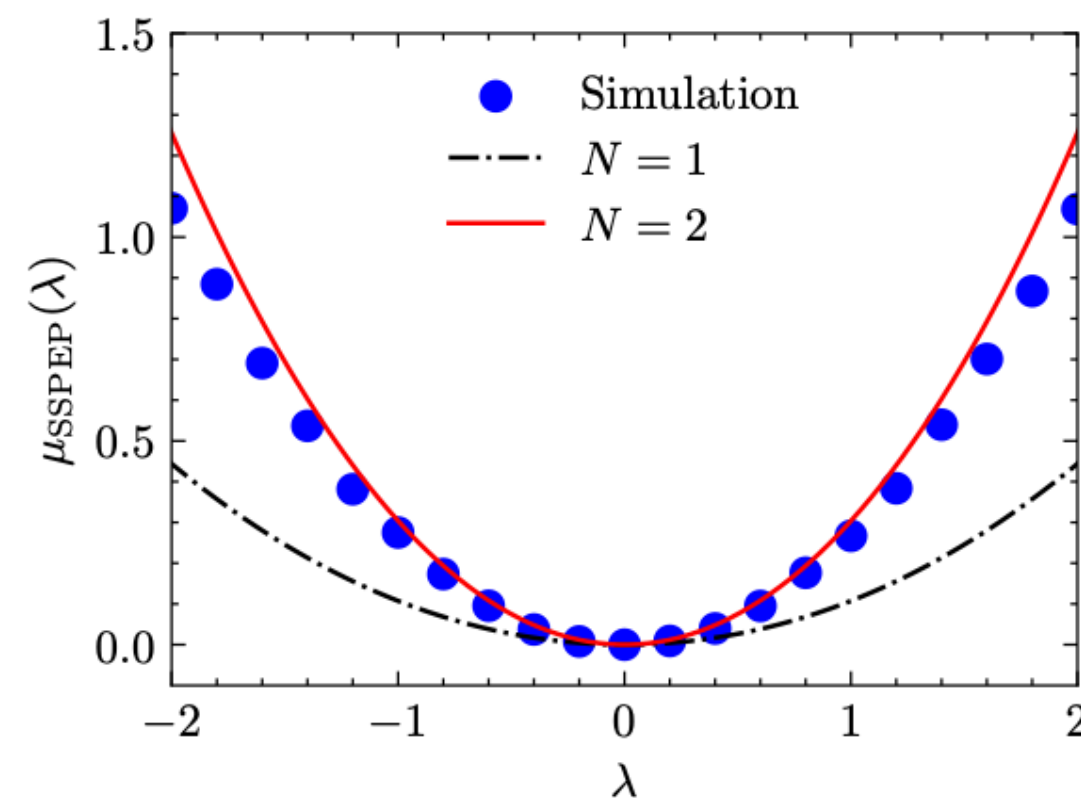
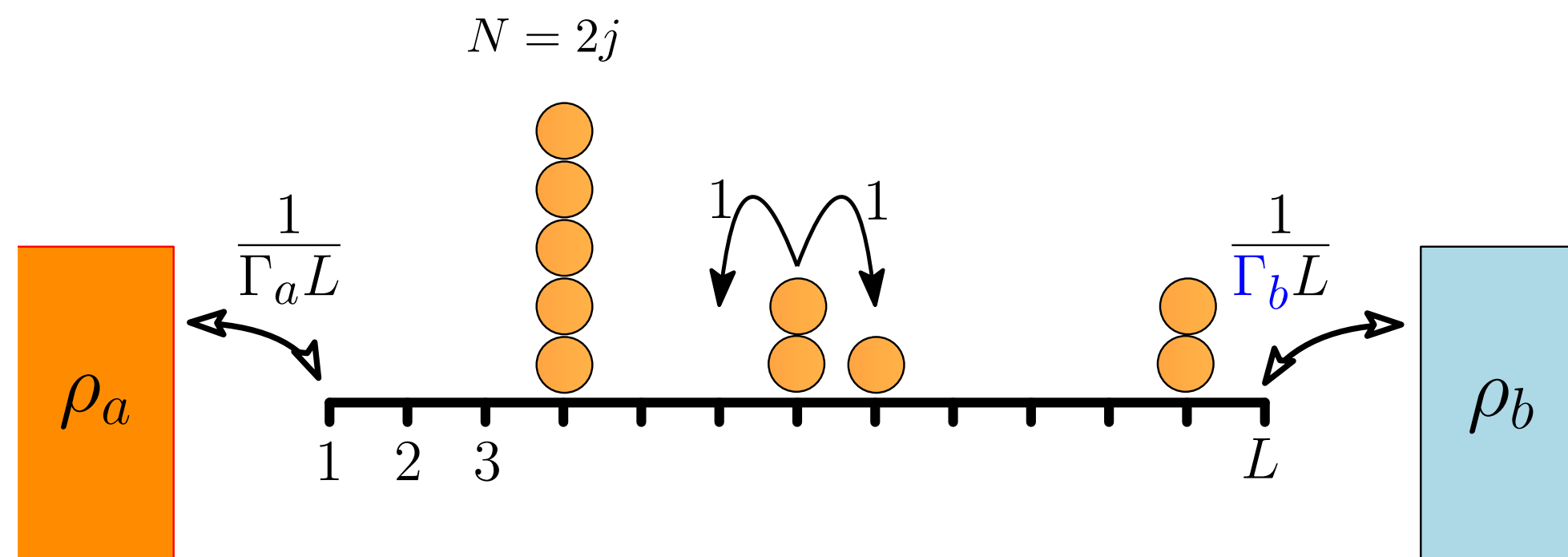
[Turkeshi, Calabrese, de Luca (PRL 2025)]

Evolution of Quantum coherence

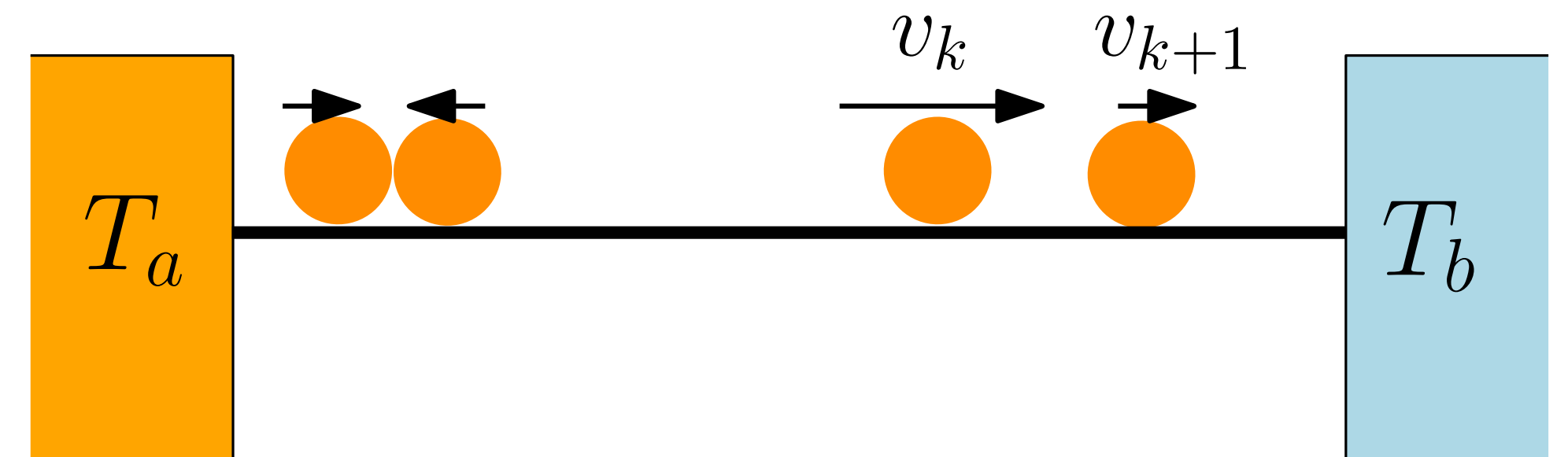
[McCulloch, Jacoby, Gopalakrishnan (arXiv: 2604.27074)]

Non-Integrable dynamics

Simple symmetric Partial Exclusion Process



Kipnis Marchiro Pressutti model



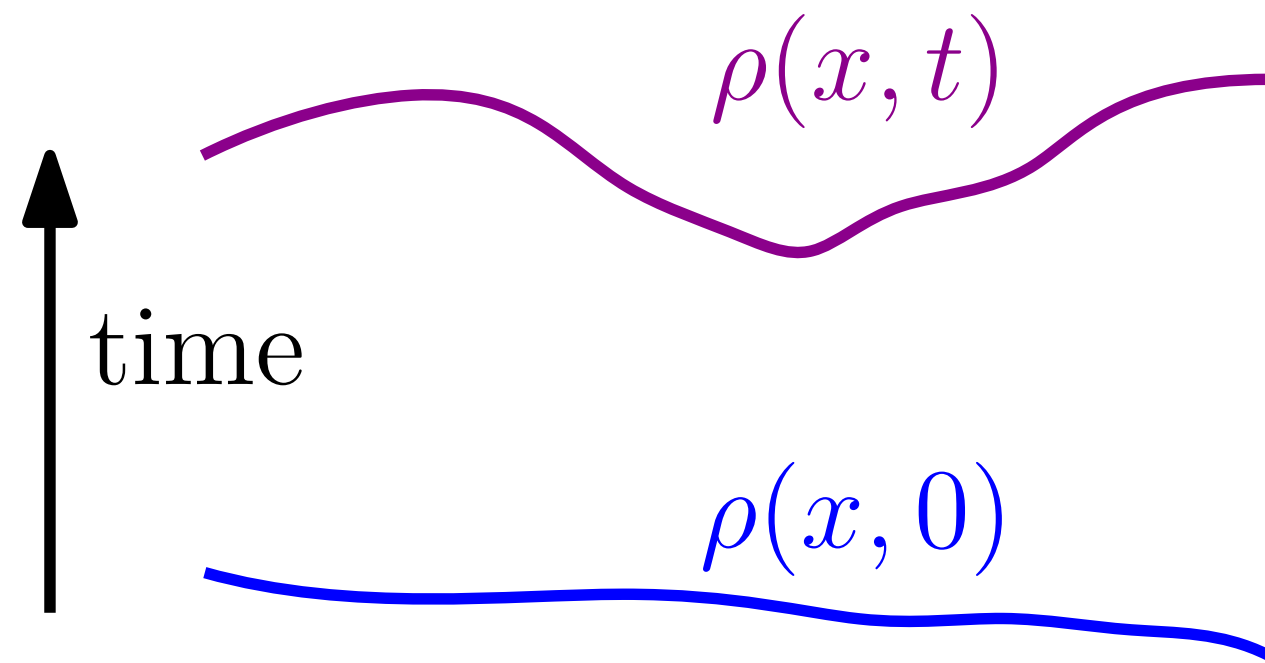
[Tailleur, Kurchan, Lecomte 2007]

[Frassek, Giardinà, Kurchan 2020]

Integrability emerges in large scale!

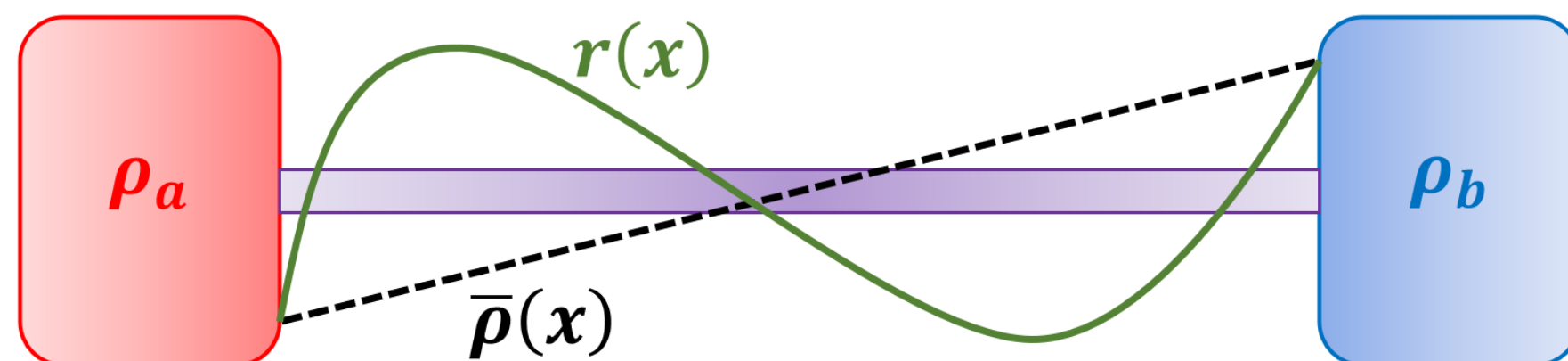
Generic diffusive systems

Coarse-grained description at a large length ℓ and time ℓ^2



$$\partial_t \rho = \nabla \cdot (D(\rho) \nabla \rho) + \ell^{-\frac{d}{2}} \nabla \cdot (\sqrt{\sigma(\rho)} \xi)$$

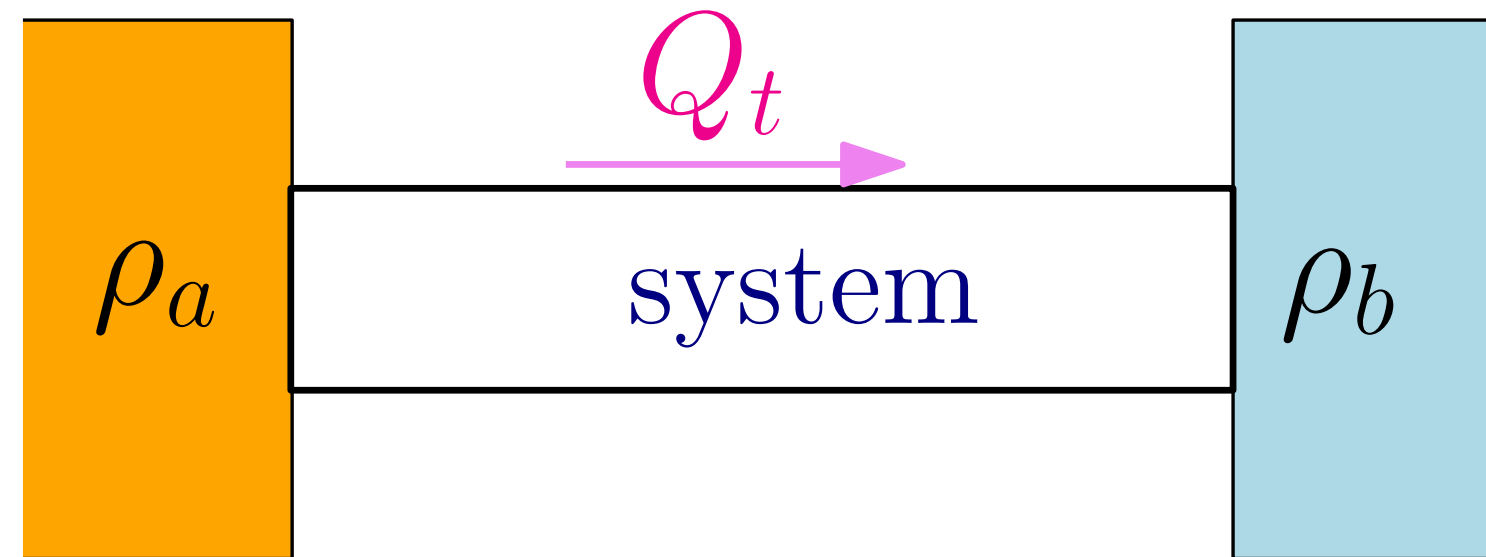
Model	$D(\rho)$	$\sigma(\rho)$
GL model	arbitrary	constant
ZRP	$g'(\rho)$	$2g(\rho)$
RAP	$\frac{\mu_1}{2} \rho^{-2}$	$\frac{\mu_1 \mu_2}{\mu_1 - \mu_2} \rho^{-1}$
SSPEP	N	$2\rho(N - \rho)$
KMP	1	$2\rho^2$
SSPIP	K	$2\rho(K + \rho)$
DPT model	1	$1 + \rho^2$
SSMEP	$\frac{1}{(1 - (M-1)\rho)^2}$	$\frac{2\rho(1 - M\rho)}{1 - (M-1)\rho}$
Brownian hard rods	$\frac{1}{(1 - a\rho)^2}$	2ρ
Brownian gas	$\beta P'(\rho)$	2ρ



[Saha, TS (arXiv:2501.0316 (2025))]

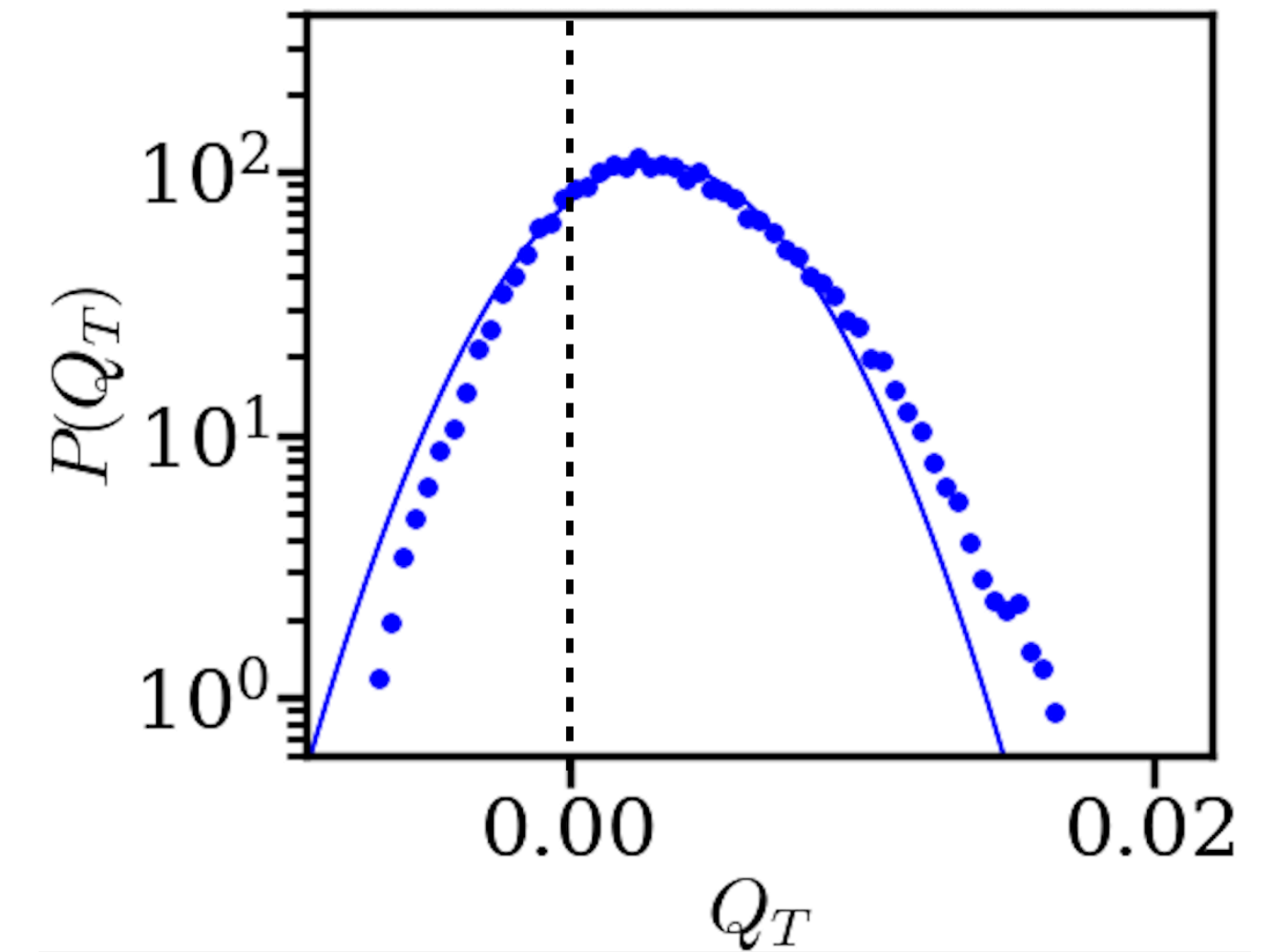
Infer generic properties

Fluctuation symmetry



$$\frac{P(-Q_t)}{P(Q_t)} \simeq e^{-c Q_t}$$

$$c = \int_{\rho_a}^{\rho_b} dx \frac{2D(x)}{\sigma(x)}$$



[Evans, Cohen, Morris, Searles' 1993, 1994] [Gallavotti, Cohen' 1995]
 [Kurchan' 1998][Lebowitz, Spohn' 1998] [Derrida, Roche, Douchot 2004]
 [Das, Ghosh, TS, Klamser, PNAS Nexus (2025)]

$$\langle e^{\lambda Q_t} \rangle \simeq e^{\sqrt{t} \chi(\lambda)},$$

$$\chi(\lambda) = \chi(-\lambda + c)$$

For $\langle e^{\int_0^T \lambda(t) \dot{Q}_t} \rangle \sim e^{\mu[\lambda(t)]},$

$$\mu[\lambda(t)] = \mu[-\lambda(1-t) + c]$$

[Sharma,
Chowdhury,
Jangid, TS
(upcoming)]

Simple consequences of Multi-time GCEMS

Consequence 1:

$$\langle Q_t \rangle = \left[\frac{\langle Q_t^2 \rangle_{eq}}{K_B T \rho^2 \kappa(\rho)} \right] (\rho_a - \rho_b)$$
$$\langle Q_{t_1} Q_{t_2} Q_{t_3} \rangle = \left[\frac{\sum_{perm} \langle Q_{t_i}^2 Q_{t_j} Q_{t_k} \rangle_{eq}}{K_B T \rho^2 \kappa(\rho)} \right] (\rho_a - \rho_b)$$

Consequence 2:

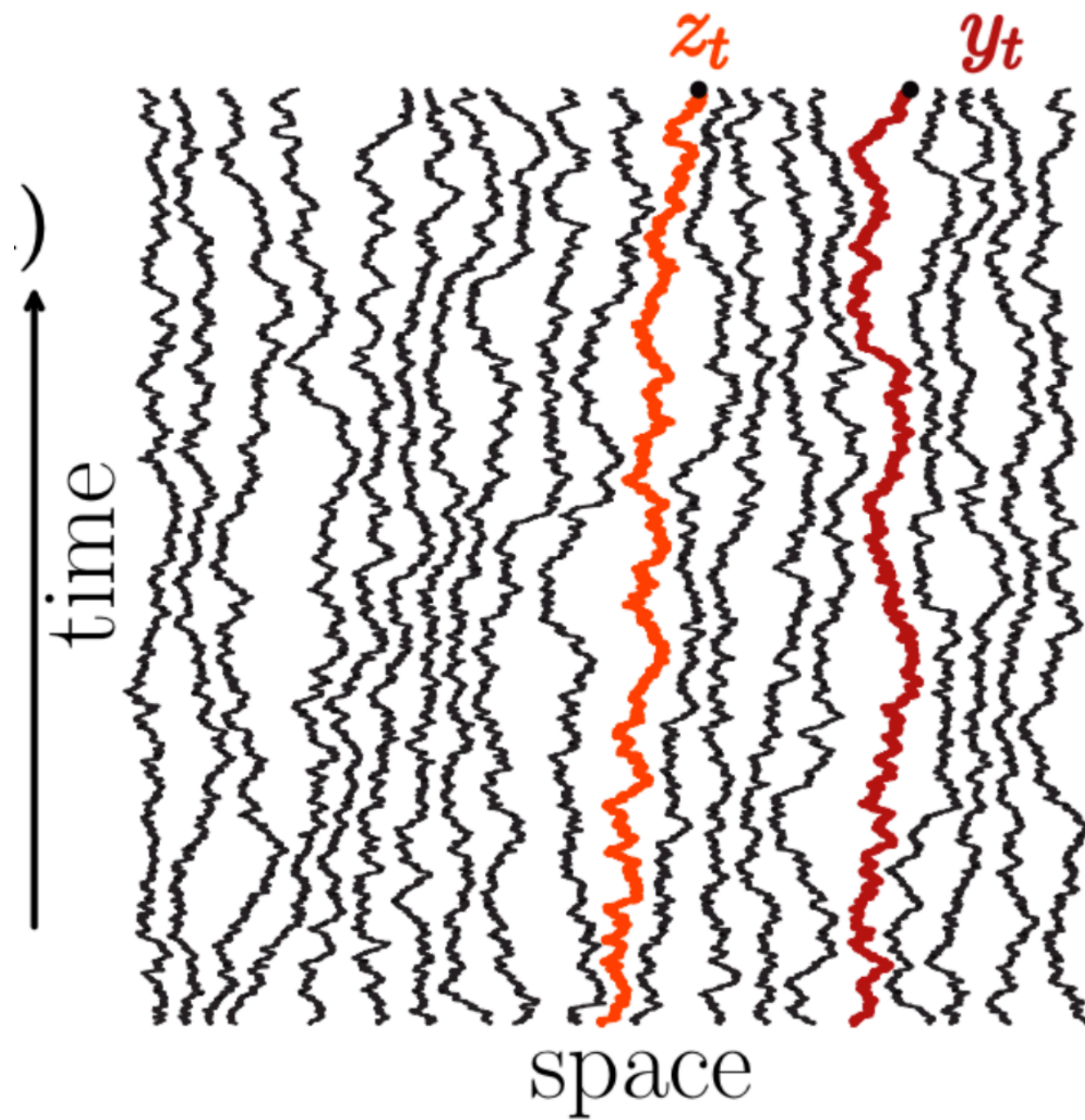
$$\langle Q(t_2) Q(t_1) \rangle_{eq} \propto t_1^{2H} + t_2^{2H} - (t_2 - t_1)^{2H}$$

Fractional Brownian motion with Hurst exponent **H**

Another extreme:

Integrable Ballistic transport

Brownian hard rods



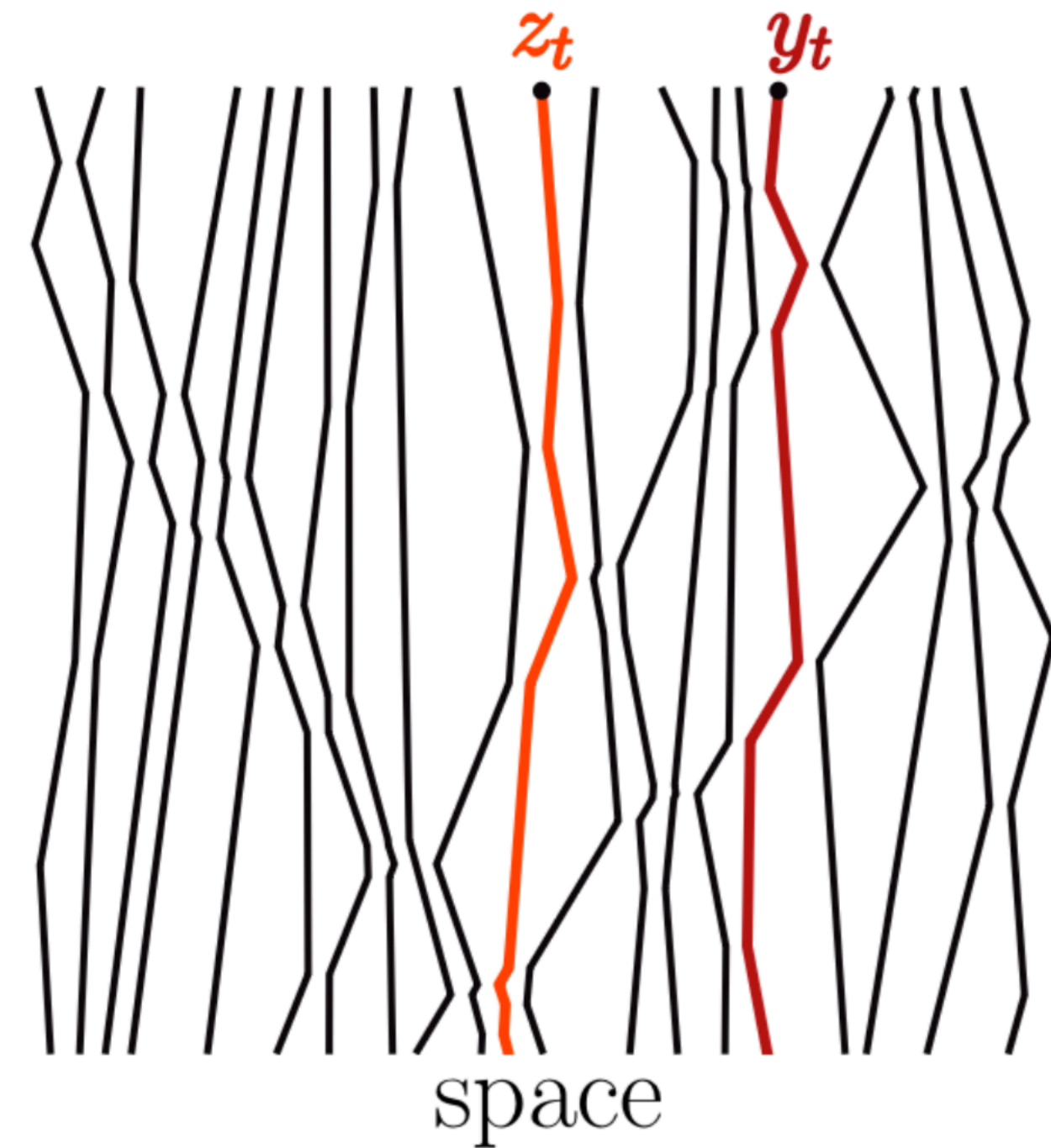
FHD

$$\partial_t \rho_t(x) = - \partial_x \left(- \frac{1}{(1 - a\rho)^2} \partial_x \rho + \sqrt{\frac{2\rho}{\ell}} \xi \right)$$

[Grabsch, Ventruelli, Benichou (PRL 2025)]

[Saha, Jangid, Arnold de Pirey, Klamsr, TS (arXiv:2601.02319)]

Ballistic hard rods



GHD

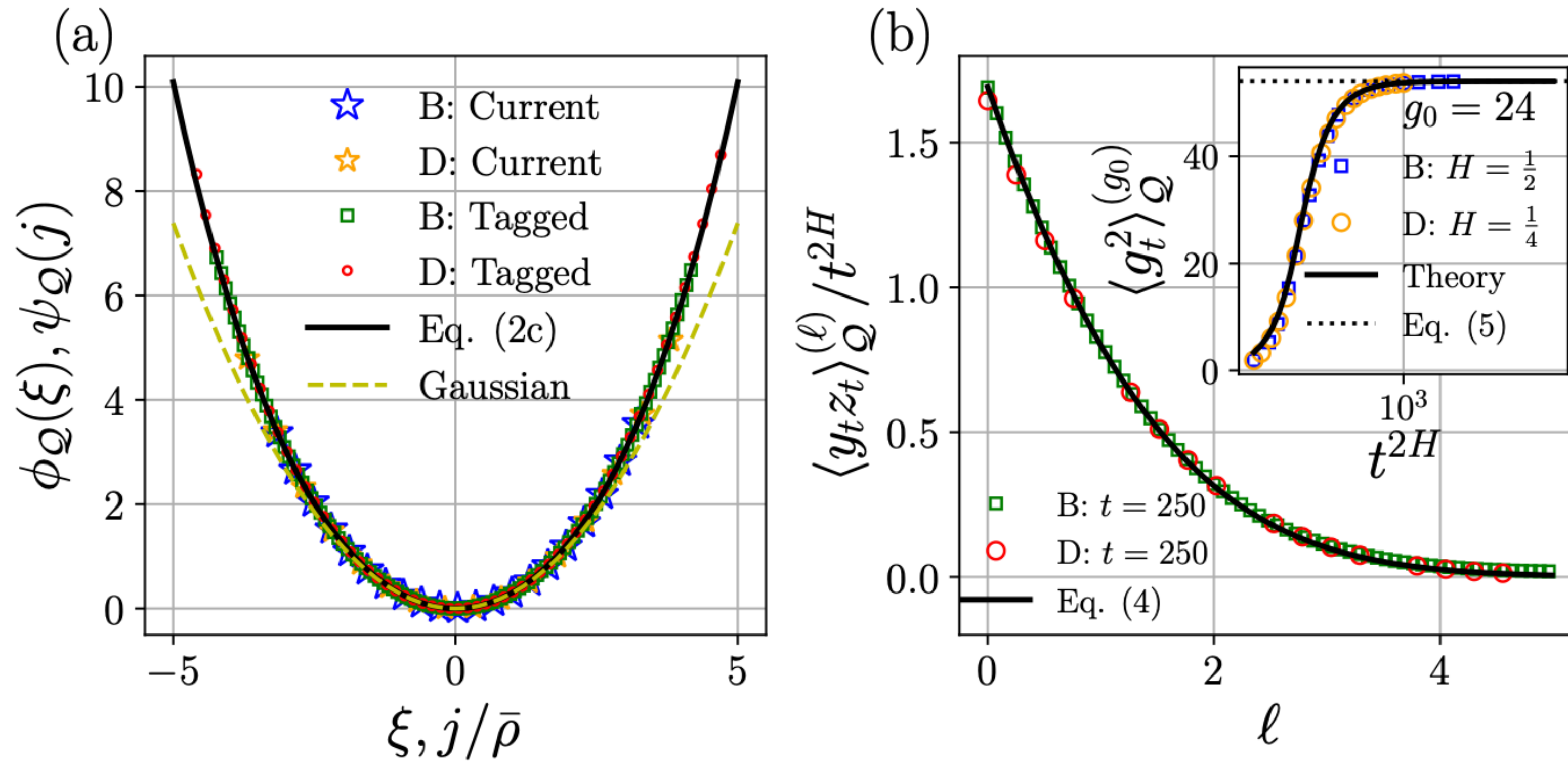
$$\partial_t Q_t(x, v) = - \partial_x \left(\frac{v - a \int dv v Q_t(x, v)}{1 - a \int dv Q_t(x, v)} Q_t + \mathbf{0} \right)$$

[Bertini, Collura, de Nardis, Fagotti (PRL 2016)]

[Castro-Alvaredo, Doyon, Yoshimura (PRX 2016)]

Initial fluctuations propagate

$$\Pr\left(\frac{z_t}{t^{2H}} = \xi\right) \asymp e^{-t^{2H}\phi(\xi)} \quad \text{with } H = \begin{cases} 1/4 & \text{diffusive} \\ 1/2 & \text{ballistic} \end{cases}$$



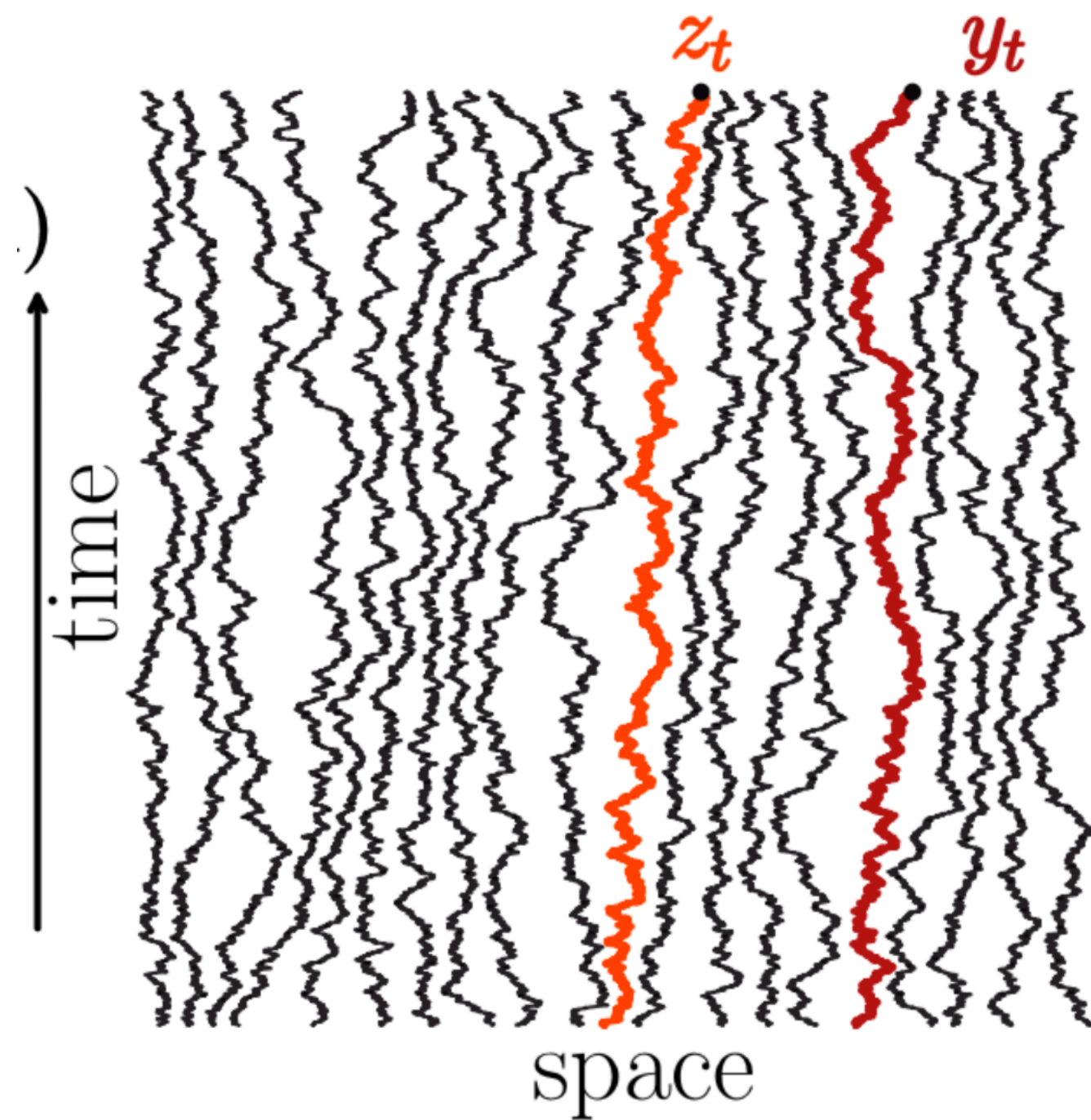
[Saha, Ketepalli, Guiselin, de Nardis, TS (arXiv:2604.24741)]

MFT

BMFT

Is there analogous hydrodynamics
possible for *Active matter*?

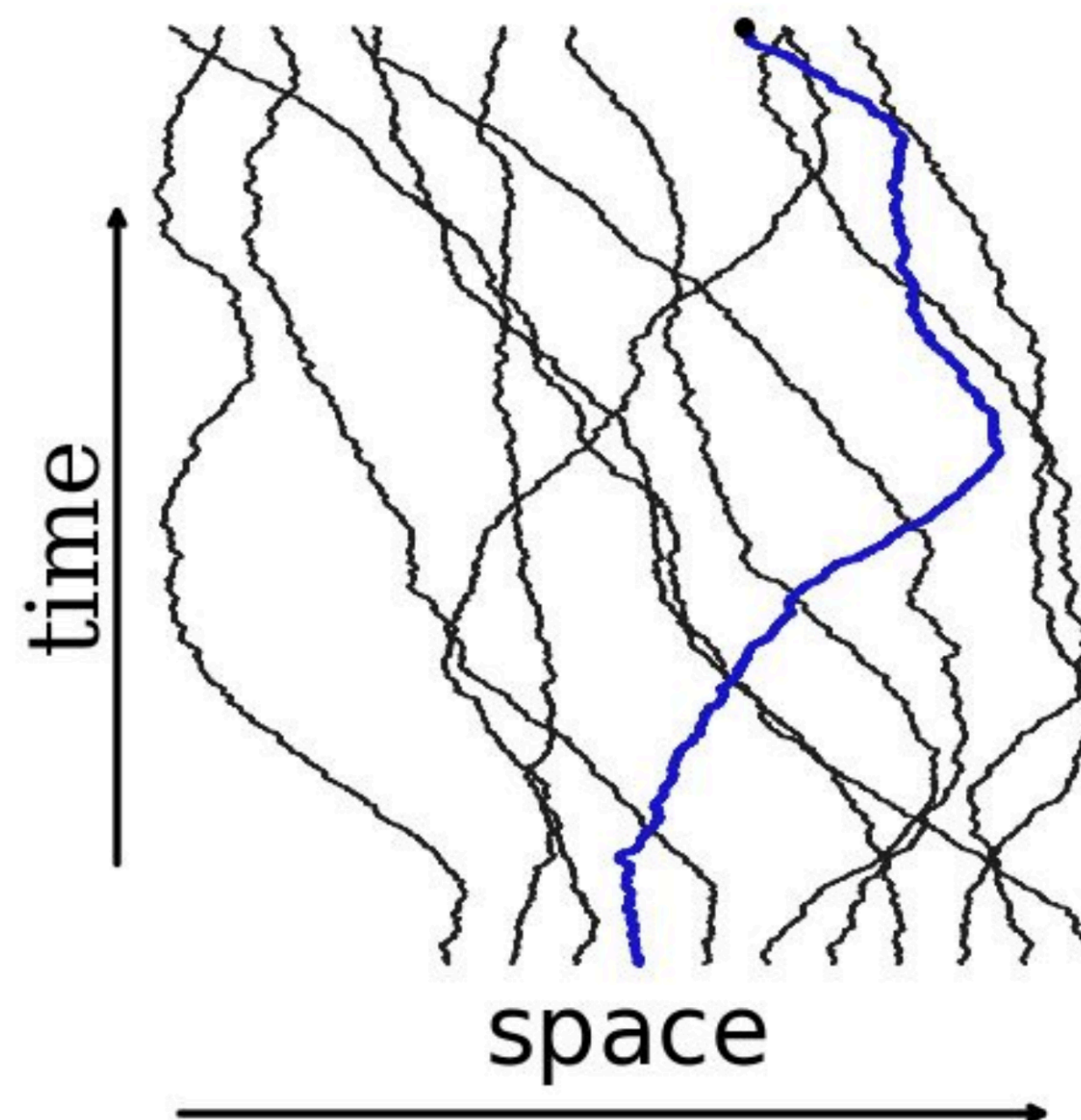
Diffusive



$$\partial_t \rho_t(x) = -\partial_x (J_{\text{euler}} + \text{noise})$$

Initial randomness

Active

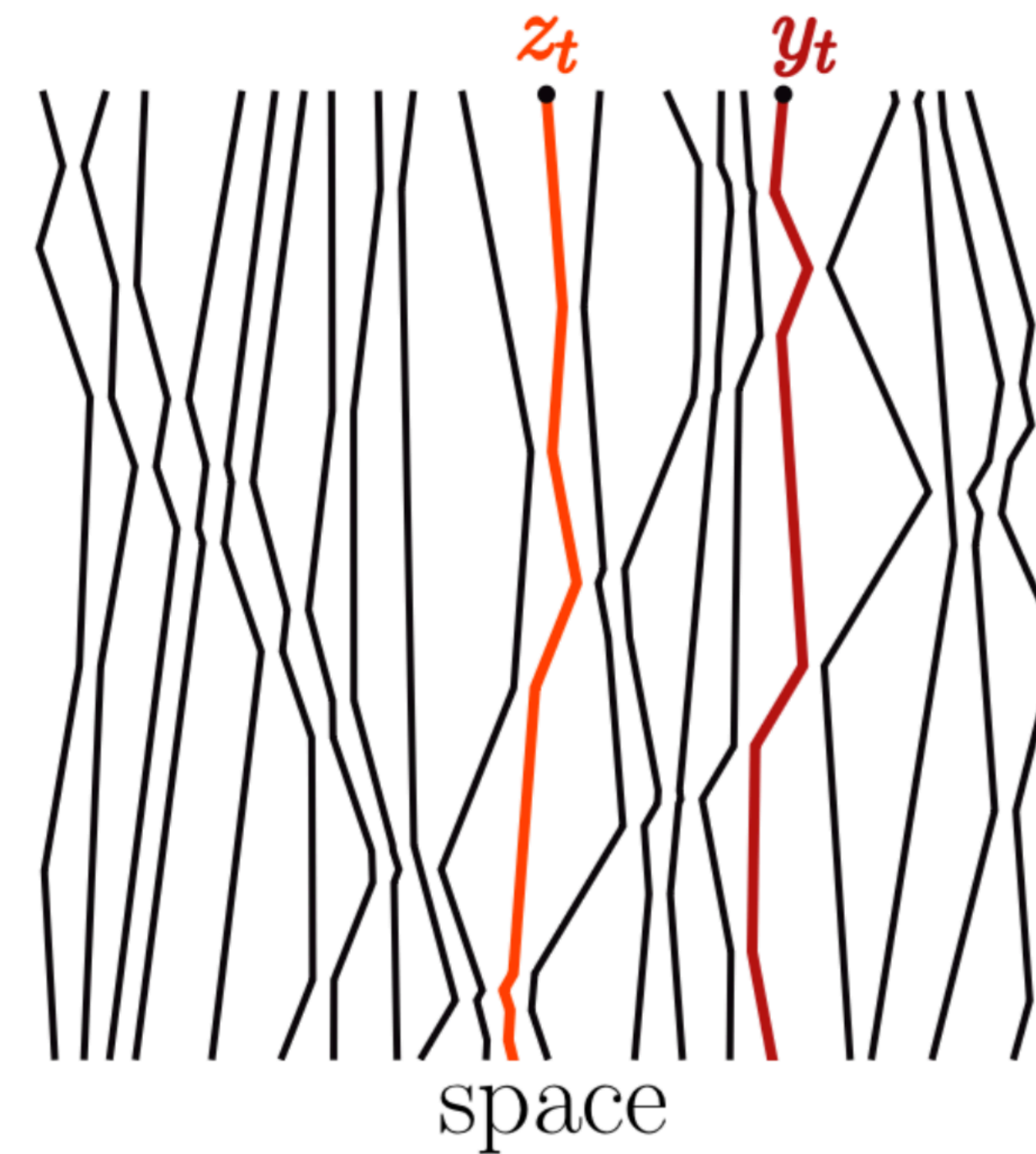


$$\partial_t \rho_t(x) = -\partial_x (J(\rho, m) + \text{noise})$$

$$\partial_t m_t(x) = I(m, \rho) + \text{noise}$$

Initial randomness

Ballistic



$$\partial_t \rho_t(x, v) = -\partial_x (J_{\text{euler}} + 0)$$

Initial randomness

Active hydrodynamics

$$\partial_t \rho_t(x) = -\partial_x (J(\rho, m) + \text{noise})$$

$$\partial_t m_t(x) = I(m, \rho) + \text{noise}$$

[Toner, Tu PRL 75, 4326 (1995)]

[Bertin, Droz, Grégoire, JPA 42, 445001 (2009)]

[Barré, Chetrité, Muratori, Peruani JSP 158, 589 (2015)]

[Partridge, Lee, PRL, 123, 068002 (2019)]

[Supekar, Song, Hastewell, Dunkel, PNAS 120 (2023)]

[Dinelli, O'Byrne, Tailleur, J Phys A 57, 395002 (2024)]

[Bebon, Robinson, Speck, PRX 15, 021050 (2025)]

[Burekovic, Luca, Cates, Nardini, arXiv:2601.16539 (2026)]

No proper Coarse-graining!

No multiplicative noise!

What should work?

- Work at the phase-space description, like in GHD.

Dean-Kawasaki equation.

[Kawasaki, Physica A, 208, 35 (1994)]

[Dean, J Phys A, 29, L613 (1996)]

- Do systematic coarse-graining.

[Illien, Rep Prog Phys, 88, 086681 (2025)]

Coarse-grain Dean-Kawasaki equation.

Coarse-graining passive Dean-Kawasaki

Brownian hard rods

$$\dot{X}_i(\tau) = -D_0\beta \sum_{j \neq i} \partial_{X_i} V(X_i(\tau) - X_j(\tau)) + \sqrt{2D_0}\eta_i(\tau)$$

$$\psi(X, \tau) = \sum_i \delta(X - X_i(\tau))$$

$$\partial_\tau \psi(X, \tau) = D_0 \partial_X^2 \psi(X, \tau) + D_0\beta \partial_X \left(\psi(X, \tau) \int_{-\infty}^{\infty} dY \partial_X V(X - Y) \psi(Y, \tau) \right) + \partial_X \sqrt{2D_0} \psi(X, \tau) \xi(X, \tau)$$

$$\psi(X, \tau) \sim \rho \left(\frac{X}{\ell}, \frac{\tau}{D_0 \ell^2} \right)$$

[Saha, Jangid, arnoux de Pirey, Klamser, TS
(arXiv:2601.02319)]

generic potential

$$\partial_t \rho = \partial_X \left(\frac{1}{(1 - a\rho)^2} \partial_x \rho \right) + \partial_x \left(\sqrt{\frac{2\rho}{\ell}} \xi \right) \longleftrightarrow \partial_t \rho = \partial_x (\beta P'(\rho) \partial_x \rho) + \partial_x \left(\sqrt{\frac{2\rho}{\ell}} \eta \right)$$

Can we do this for active
dynamics?

Non-Interacting Active matter models

Coarse-graining: $\psi_T(X, V) \sim \rho_{\frac{T}{\tau}} \left(\frac{X}{\ell}, \frac{V}{v_0} \right)$ ℓ is diffusive length
 τ is persistent time

Hydrodynamics: $\partial_t \rho_t(x, v) = -\nabla_{x,v} \cdot \mathbf{J}[\rho_t] + \frac{1}{\ell^{d/2}} \nabla_{x,v} \cdot \chi_t(x, v)$

1d AOUP

$$\dot{X}_i = V_i + \sqrt{2D} \eta_i$$

$$\tau \dot{V}_i = -V_i + \sqrt{2D_v} \eta_i$$

with $\ell = \sqrt{D\tau}$ and $v_0 = \sqrt{D_v/\tau}$

$$\begin{aligned} \partial_t \rho_t(x, v) = & \partial_x^2 \rho - \text{Pe } v \partial_x \rho + \partial_v^2 \rho + \partial_v(v\rho) \\ & + \ell^{-1/2} \partial_x (\sqrt{2\rho} \eta) \\ & + \ell^{-1/2} \partial_v (\sqrt{2\rho} \xi) \end{aligned}$$

2d ABP

$$\dot{X}_i = v_0(\cos \theta_i, \sin \theta_i) + \sqrt{2D} \eta_i$$

$$\dot{\theta}_i = \sqrt{\frac{2}{\tau}} \xi_i$$

with $\ell = \sqrt{D\tau}$

$$\begin{aligned} \partial_t \rho_t(x, \theta) = & \Delta \rho - \text{Pe} (\cos \theta, \sin \theta) \cdot \nabla \rho + \partial_\theta^2 \rho \\ & + \ell^{-1} \nabla \cdot (\sqrt{2\rho} \vec{\eta}) \\ & + \ell^{-1} \partial_\theta (\sqrt{2\rho} \xi) \end{aligned}$$

1d RTP

$$\dot{X}_i = v_0 \sigma_i + \sqrt{2D} \eta_i$$

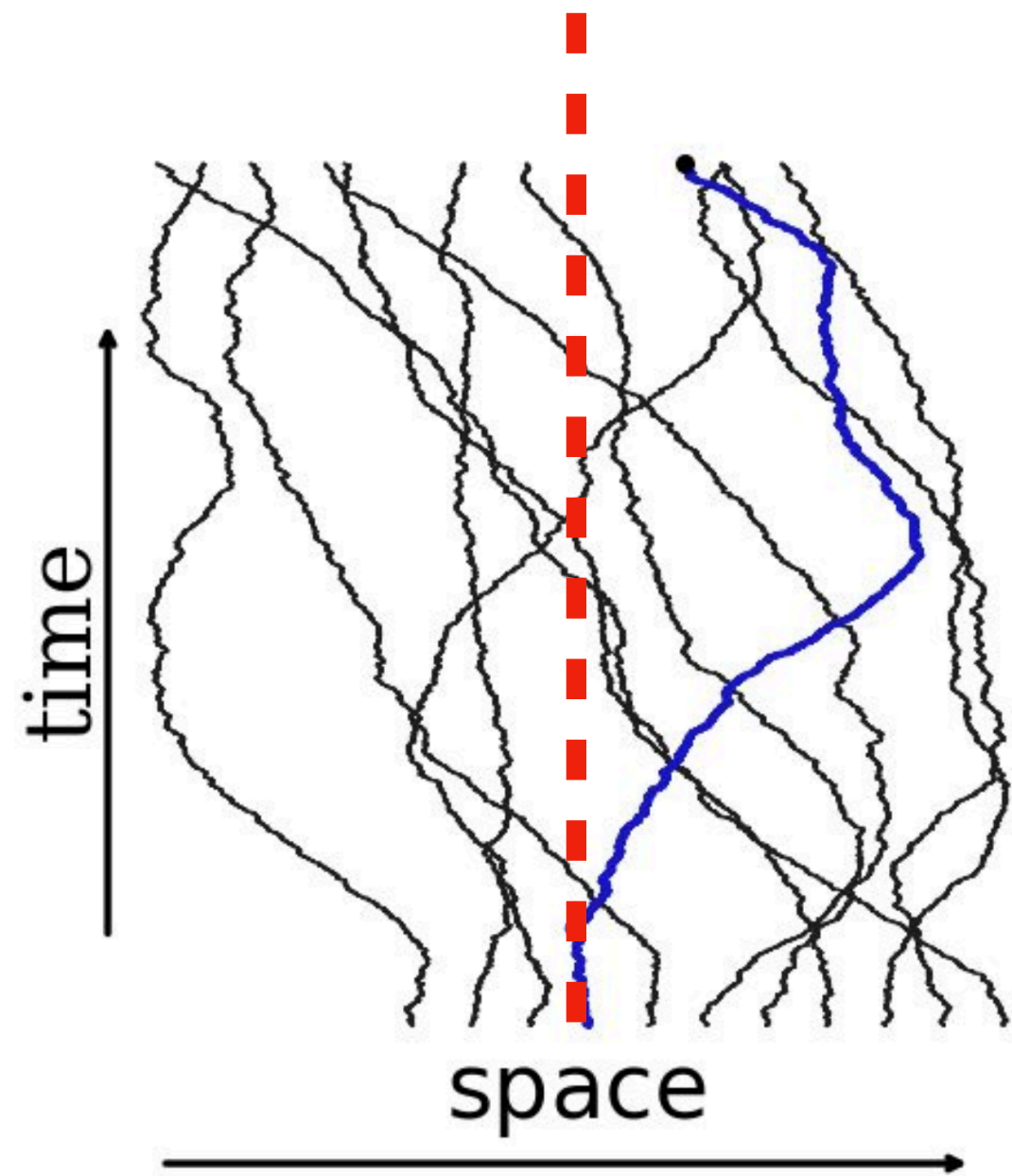
σ_i flips sign at rate $\frac{1}{\tau}$

with $\ell = \sqrt{D\tau}$

$$\begin{aligned} \partial_t \rho_t(x, \sigma) = & \partial_x^2 \rho - \text{Pe} \sigma \partial_x \rho + (\rho(x, -\sigma) - \rho(x, \sigma)) \\ & + \ell^{-1/2} \partial_x (\sqrt{2\rho} \eta) \\ & + \frac{1}{\ell_d} (\xi_t(x, -\sigma) - \xi_t(x, \sigma)) \end{aligned}$$

Does it live up to the promise?

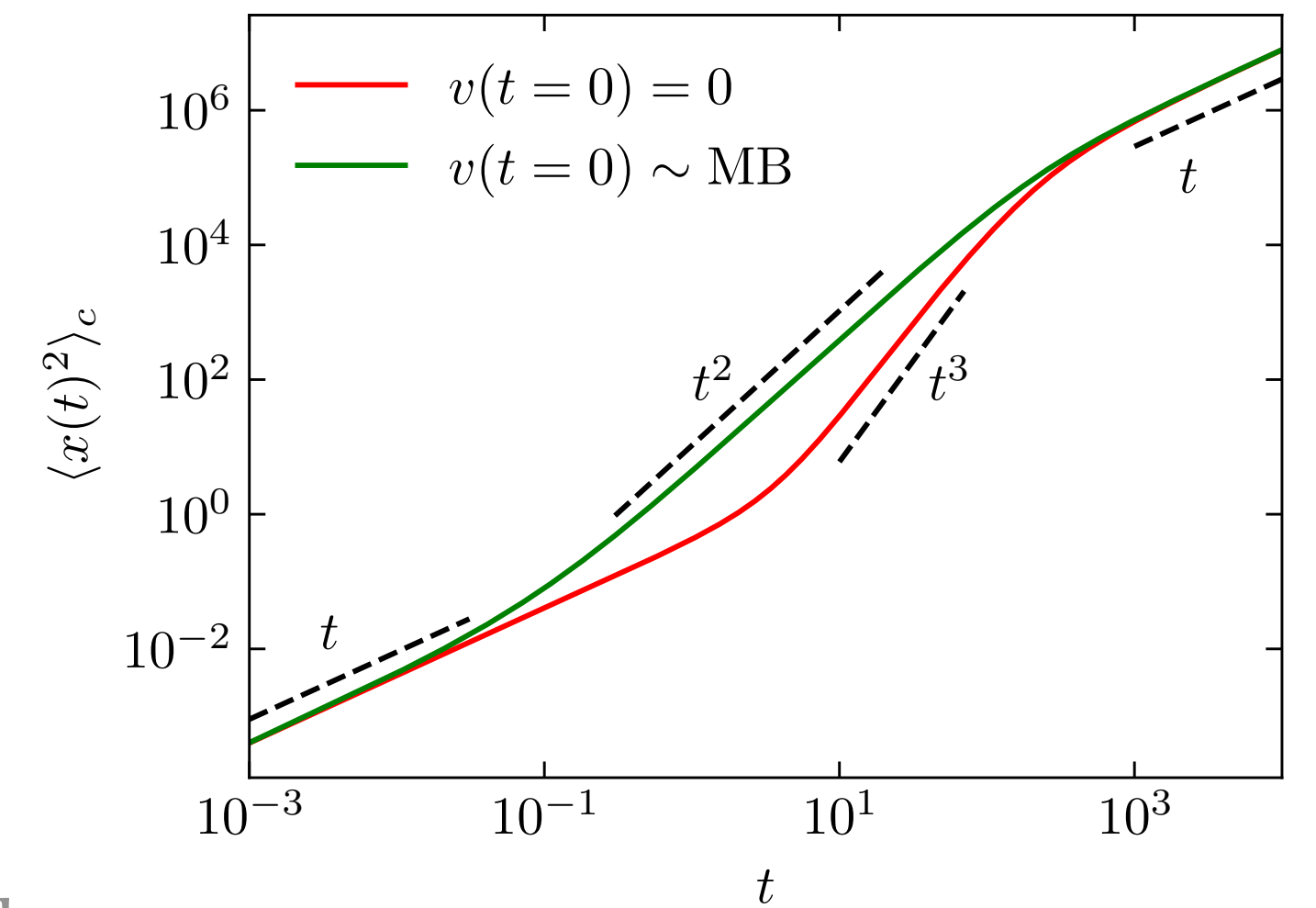
Current LDF in non-interacting AOUP



$$P(Q_t) \sim e^{-\sigma_t} \phi\left(\frac{Q_t}{\sigma_t}\right)$$

[Jangid, Kumbhakar, Klamser, TS (upcoming)]

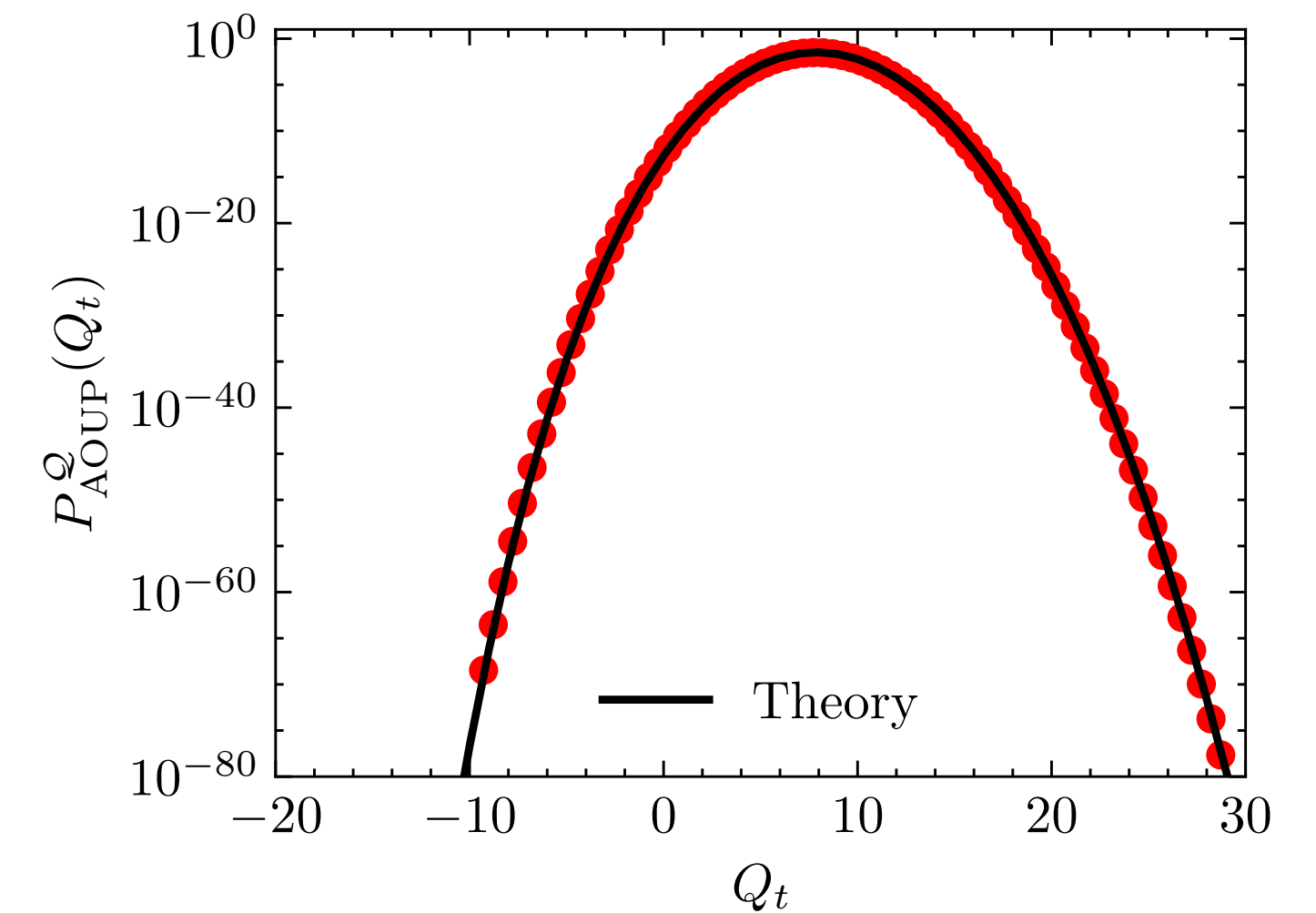
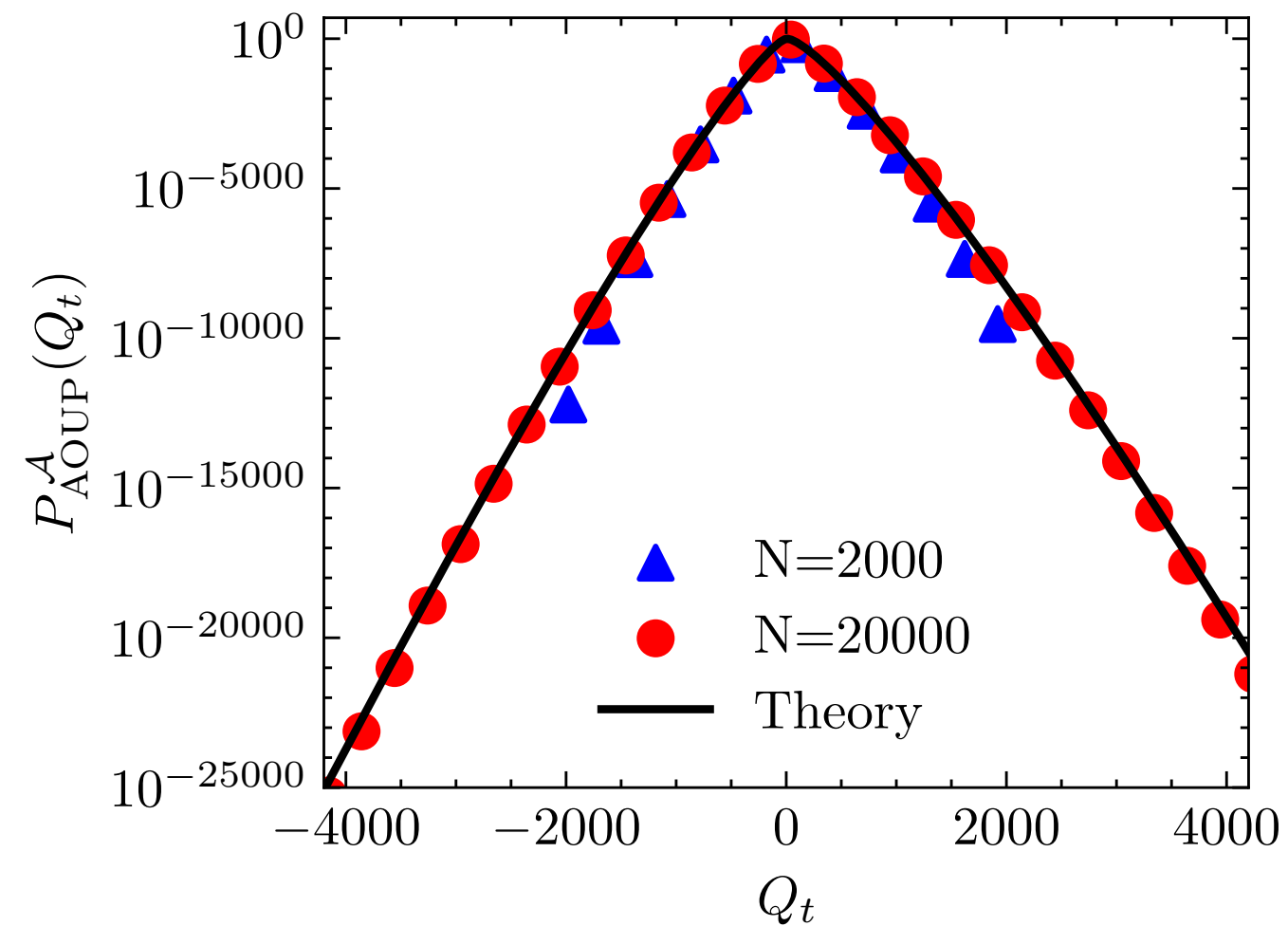
[Sharma, Jangid, Pattanayak, Klamser, Pirey, TS (upcoming)]



Annealed vs Quenched

$$\mu_{\mathcal{A}}(\lambda) = \ln \overline{\langle e^{\lambda Q_t} \rangle}$$

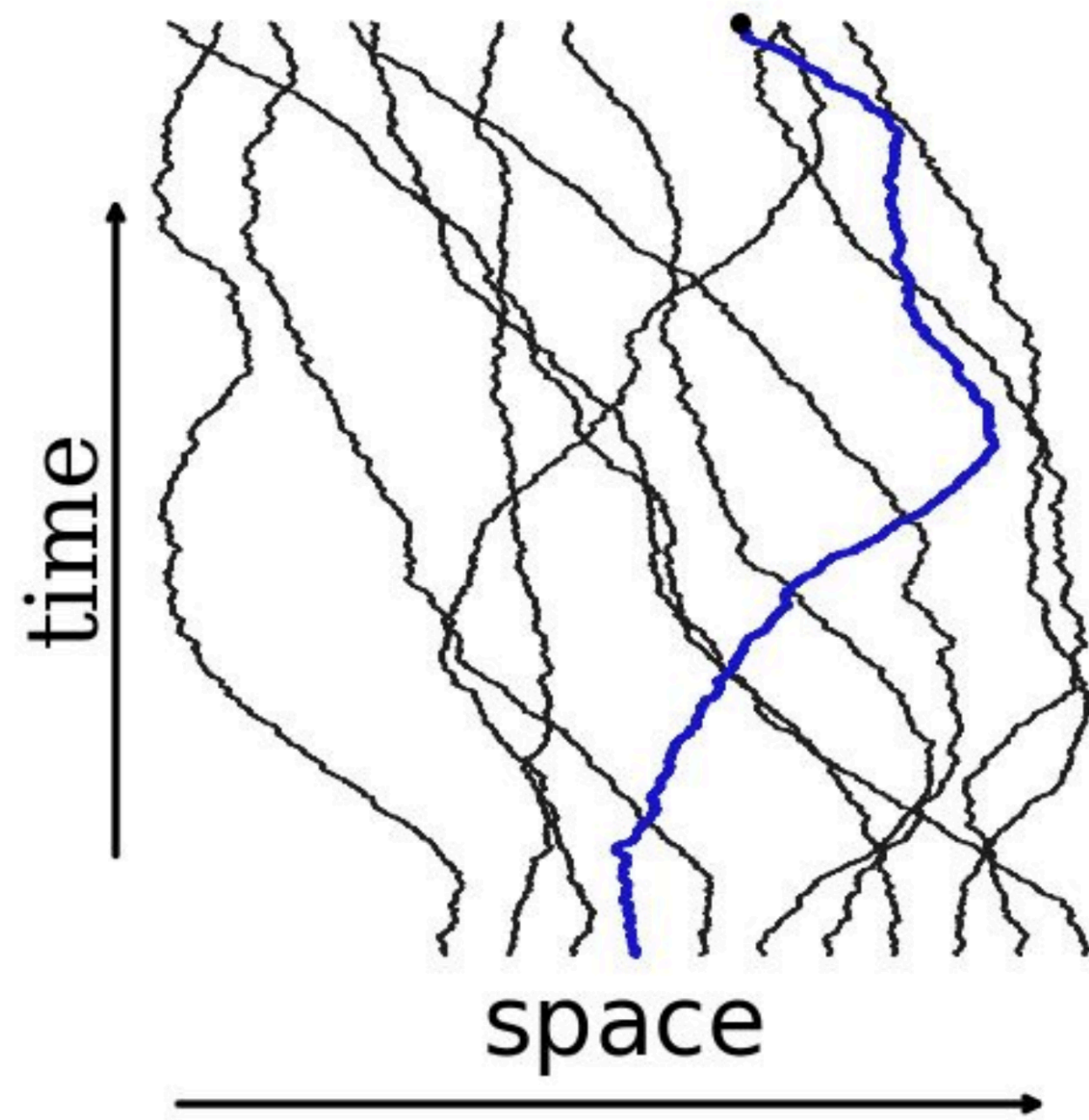
$$\mu_{\mathcal{Q}}(\lambda) = \overline{\ln \langle e^{\lambda Q_t} \rangle}$$



Current LDF in non-interacting RTP

[Banerjee, Majumdar, Rosso, Schehr 2020]

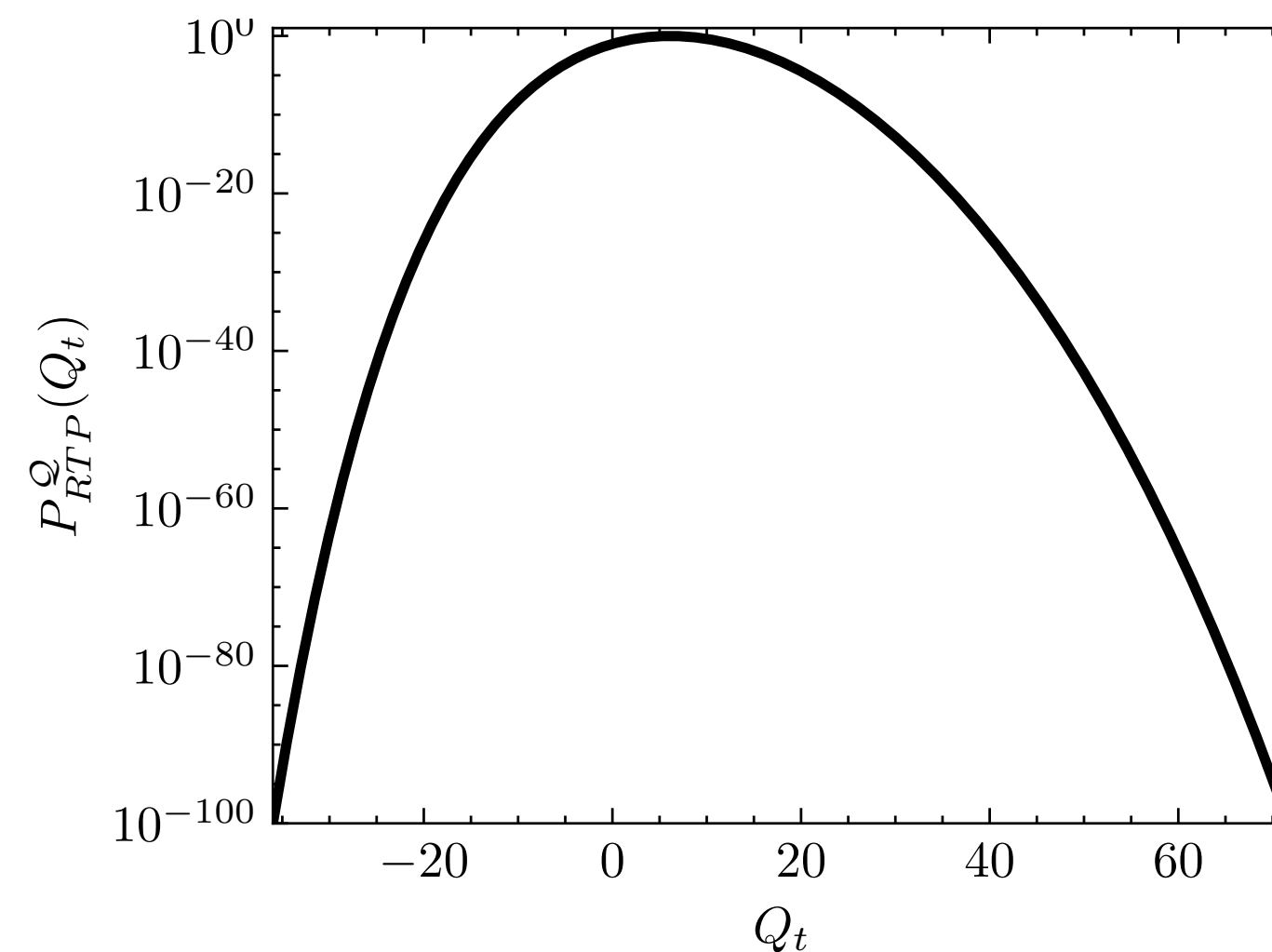
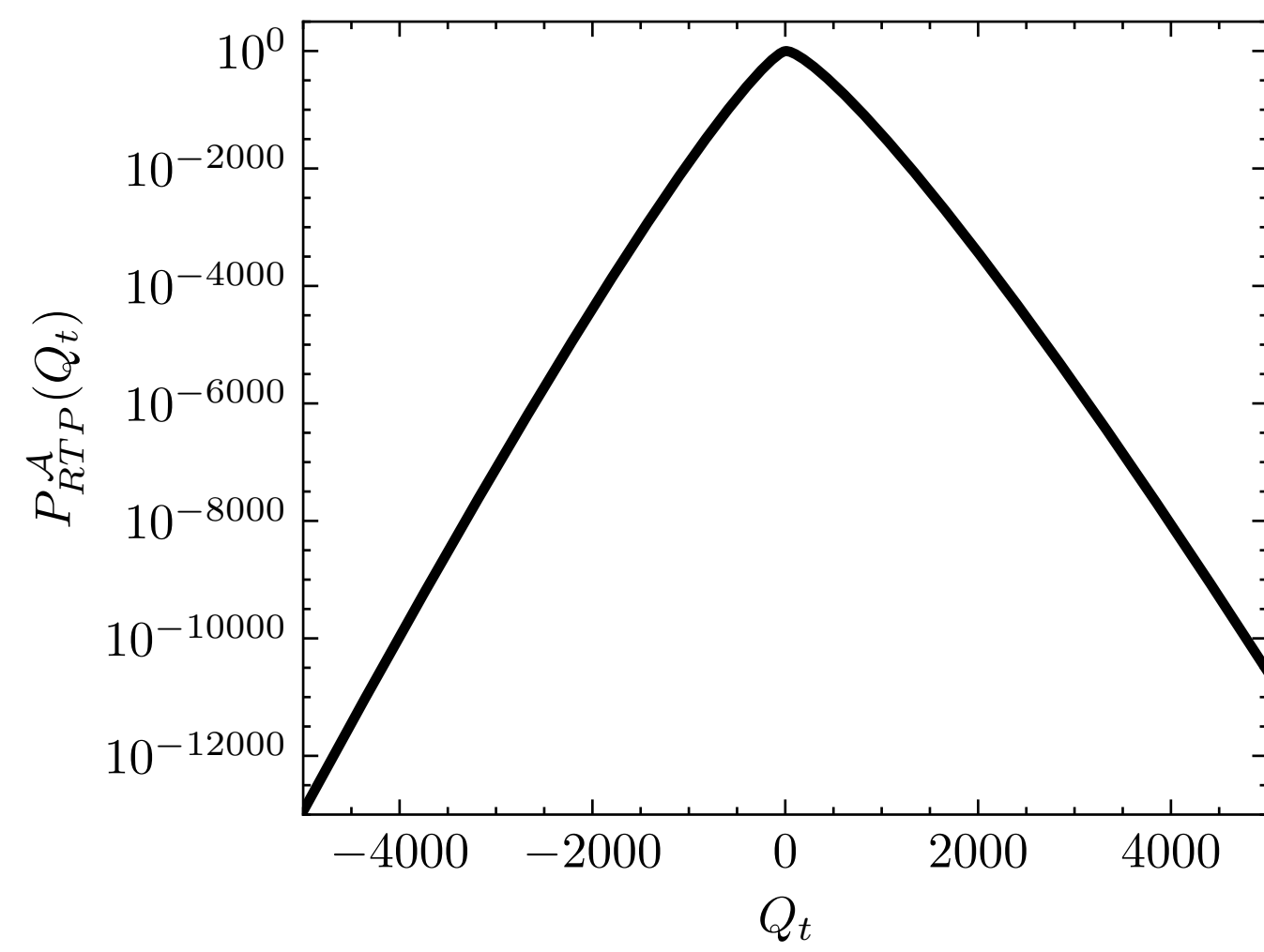
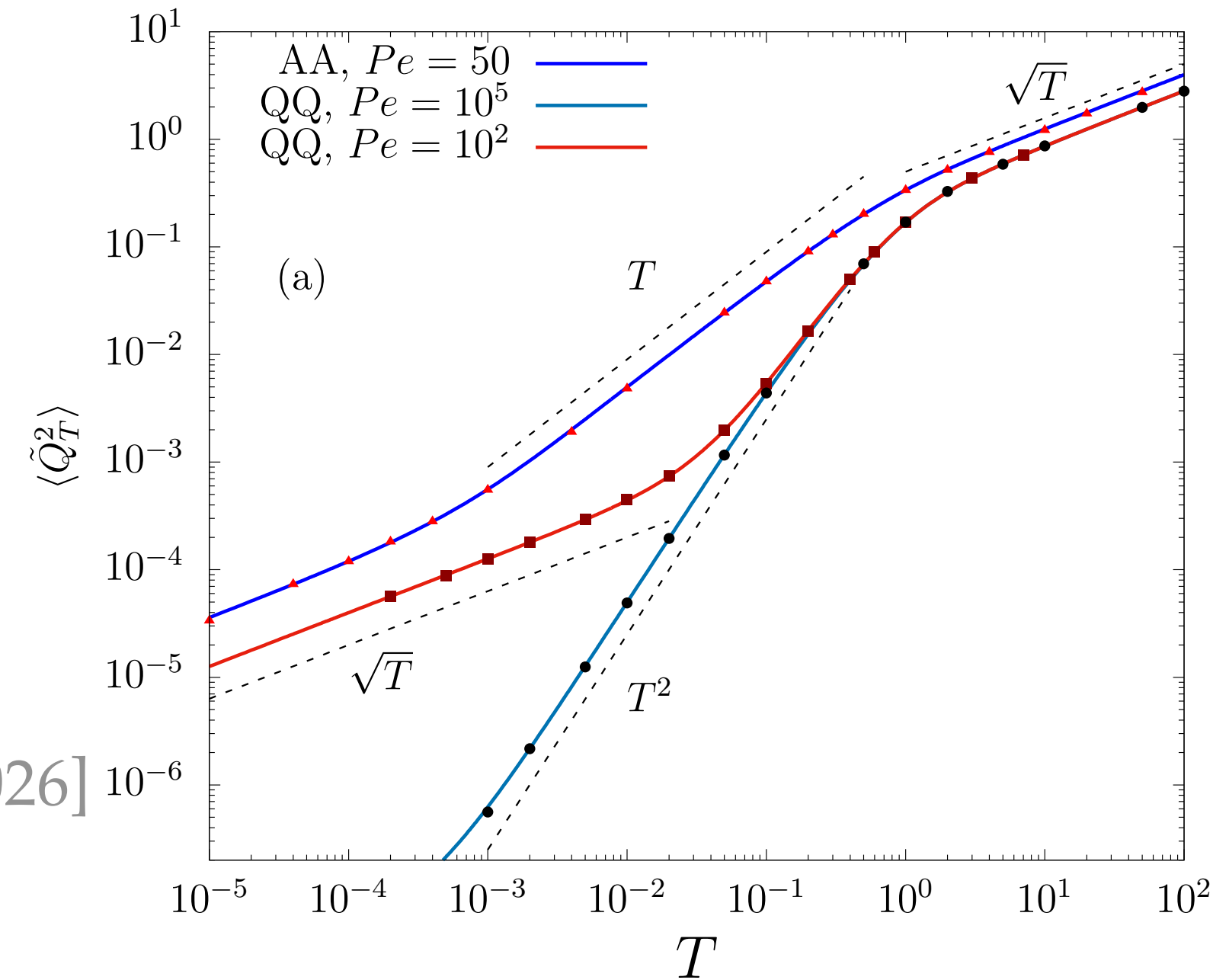
[Jose, Rosso, Ramola 2023]



$$P(Q_t) \sim e^{-\sigma_t \phi\left(\frac{Q_t}{\sigma_t}\right)}$$

[Jangid, Kumbhakar, Klamser, TS 2026]

[Sharma, Jangid, Pattanayak, Klamser, Pirey, TS 2026]



How was the computation
done?

Active version of MFT / BMFT

$$\partial_t \varrho_t(x, v) = -\nabla_{x,v} \cdot \mathbf{J}[\varrho_t] + \frac{1}{\ell^{d/2}} \nabla_{x,v} \cdot \chi_t(x, v)$$

time


$$\mathcal{P}[\varrho_{\text{in}} | \varrho_{\text{fi}}] \sim \int_{\varrho_{\text{in}}}^{\varrho_{\text{fi}}} \mathcal{D}[\varrho, \hat{\varrho}] e^{-\ell^d S[\varrho, \hat{\varrho}]}$$

$$\langle e^{\lambda Q} \rangle \sim \int_{\varrho_{\text{in}}}^{\varrho_{\text{fi}}} \mathcal{D}[\varrho, \hat{\varrho}] e^{-\ell^d \{S[\varrho, \hat{\varrho}] - \lambda Q / \ell^d\}} \sim e^{-\ell^d \min\{S[\varrho, \hat{\varrho}] - \lambda Q / \ell^d\}}$$

[Doyon, Perfetto, Sasamoto, Yoshimura (Scipost Phys 2023)]

[Kethepalli, Urilyon, TS, de Nardis (Scipost Phys 2026)]

What about interacting particle?

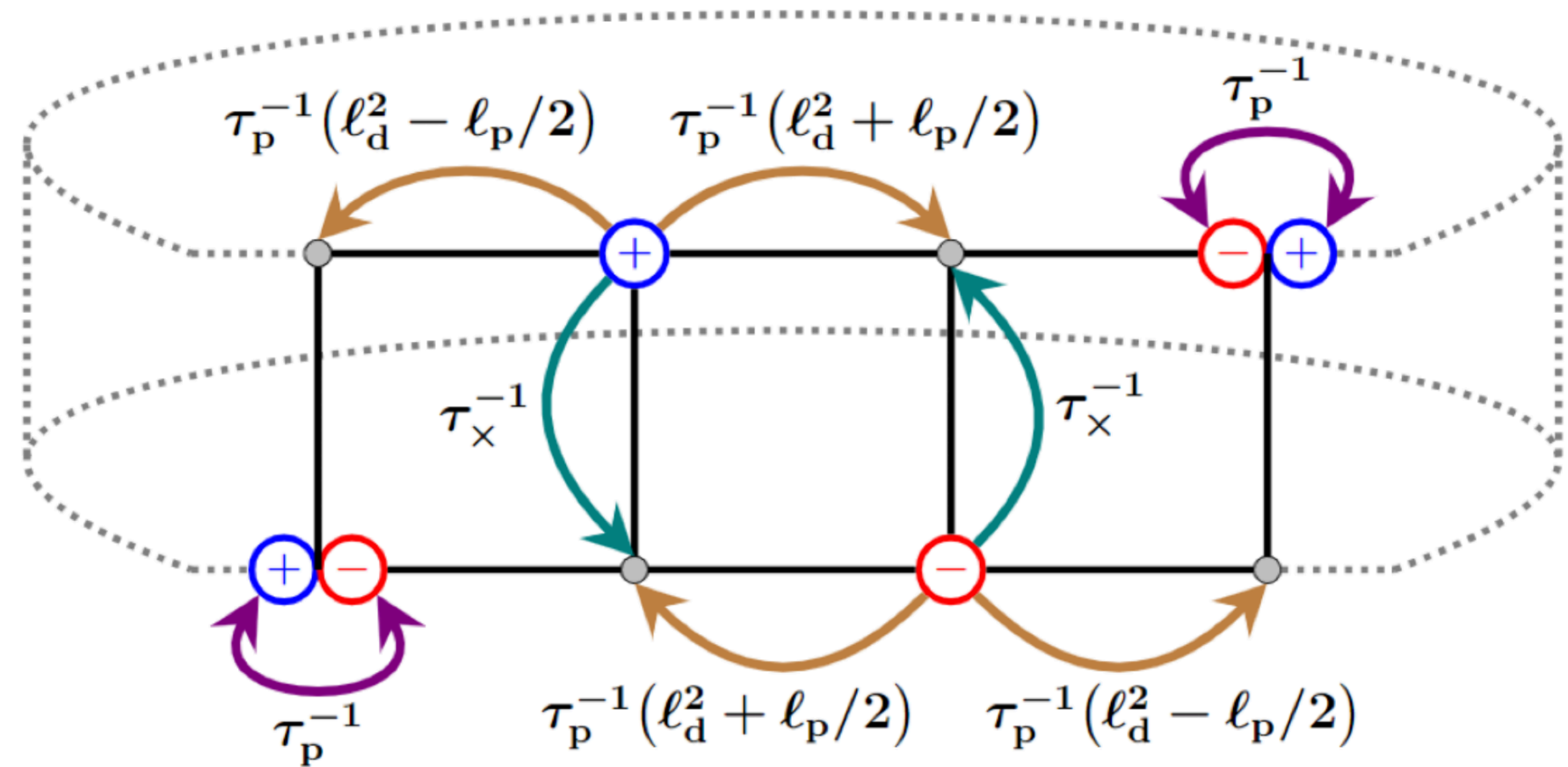
GHD of interacting ABP in 2d

$$\partial_t \rho_t(x, \theta) = -\nabla \cdot \left[\text{Pe} u \rho_t + \text{[redacted]} \right] + \partial_\theta^2 \rho_t + \ell_d^{-d/2} \nabla \cdot \left(\sqrt{2\rho_t} \hat{\eta} \right) + \ell_d^{-d/2} \partial_\theta \left(\sqrt{2\rho_t} \hat{\xi} \right)$$

The next best option

Interacting Active matter on lattice

[Mukherjee, Saha, TS, Dhar, Sabhapandit, PRE 111,024128 (2025)]

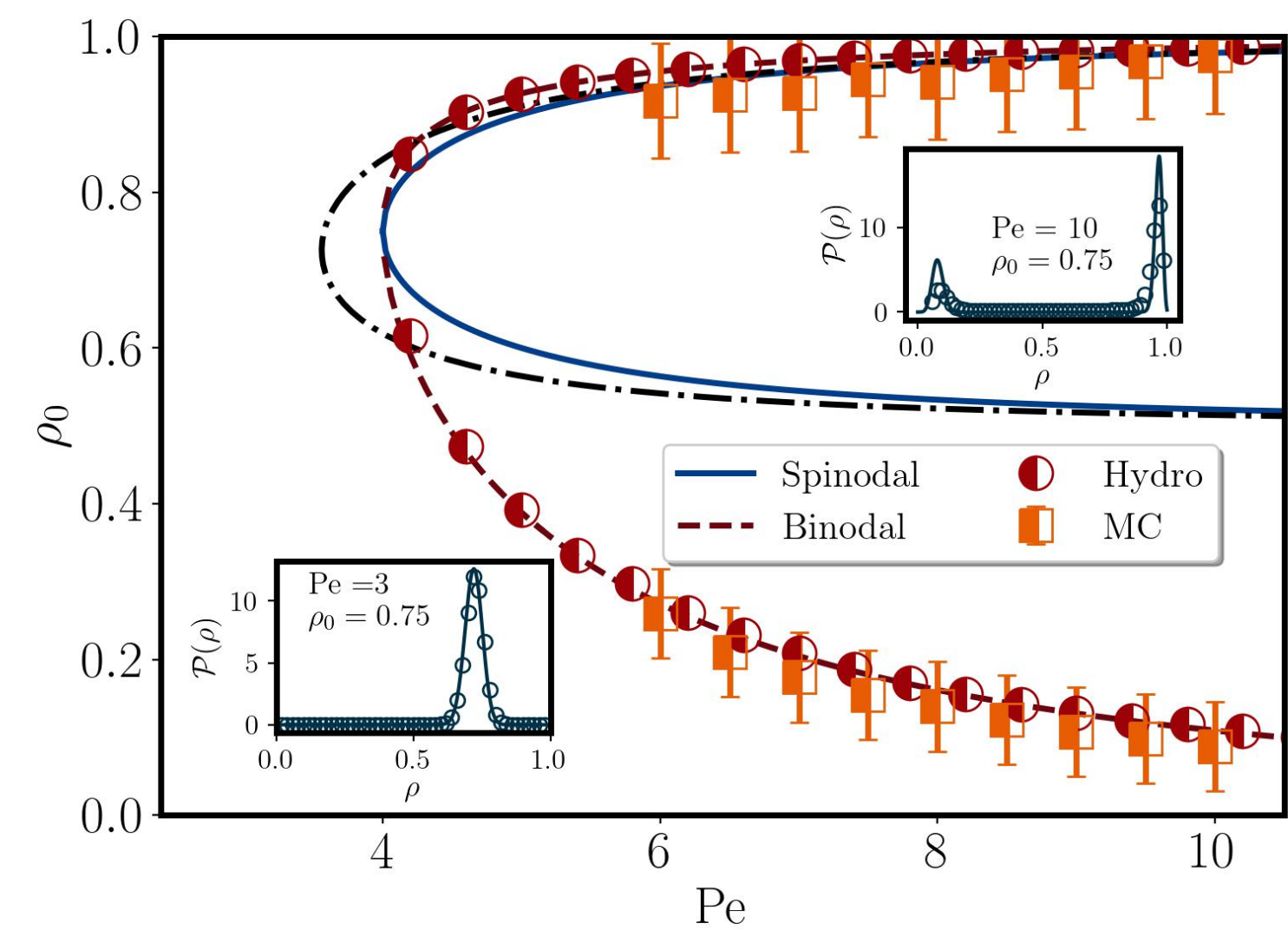
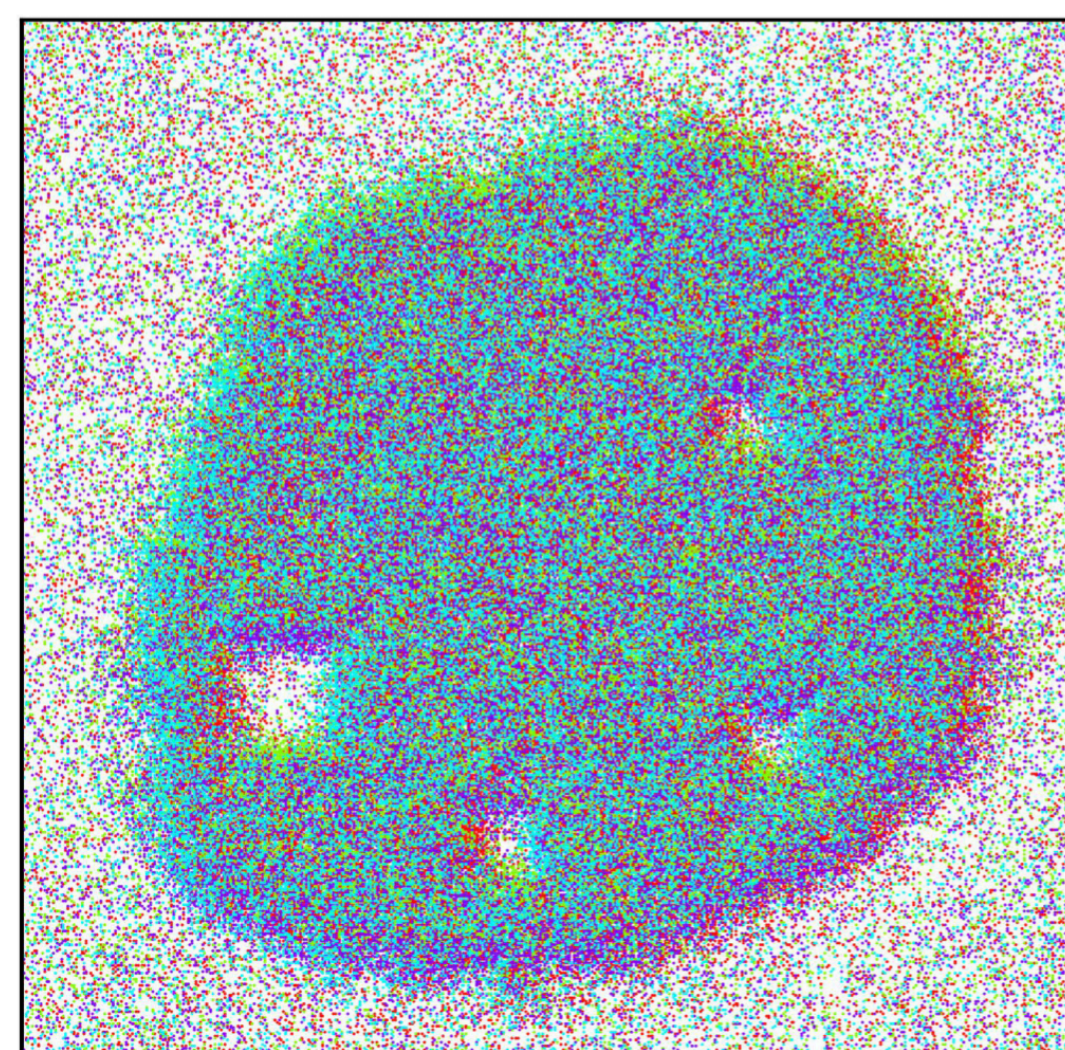
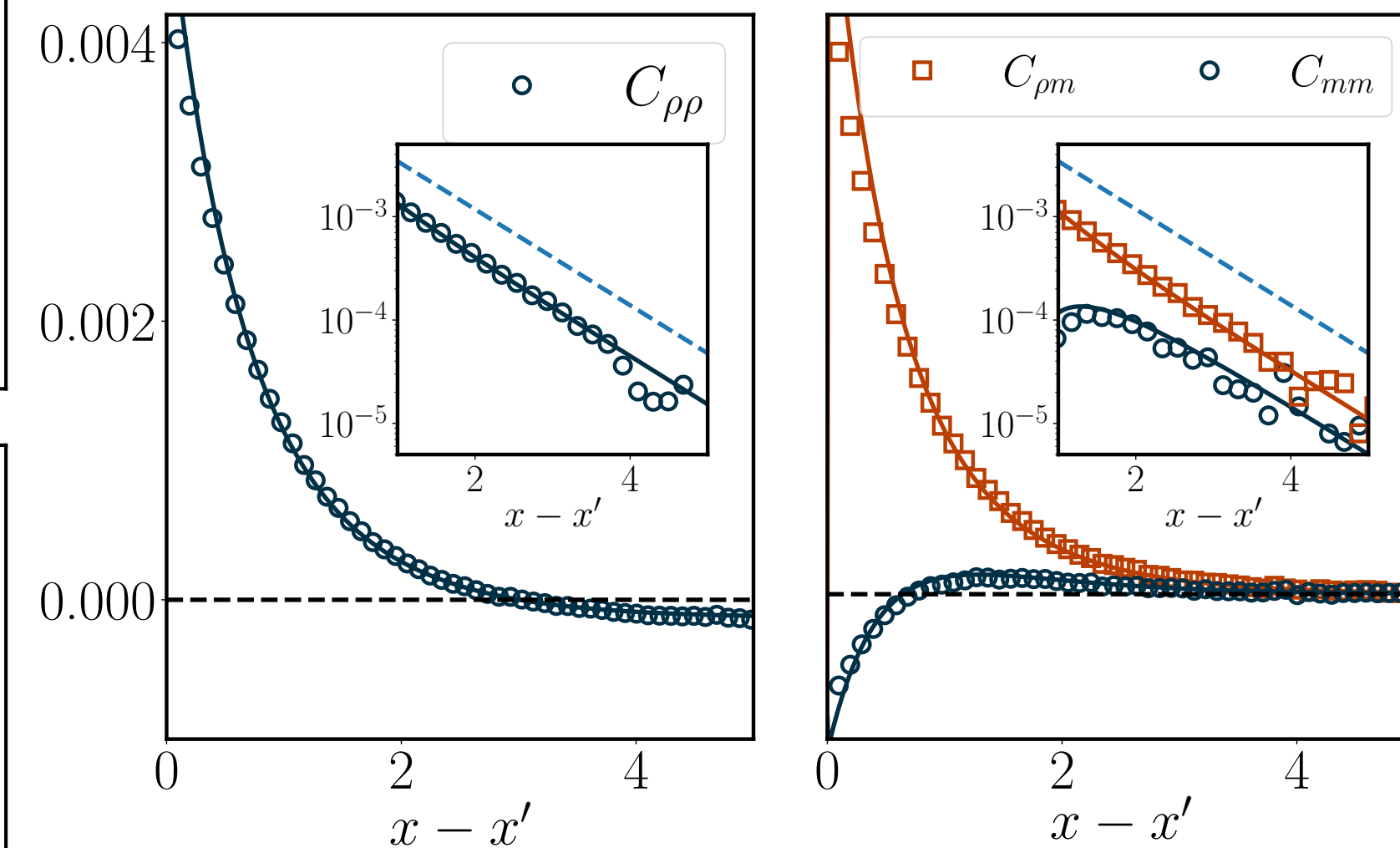
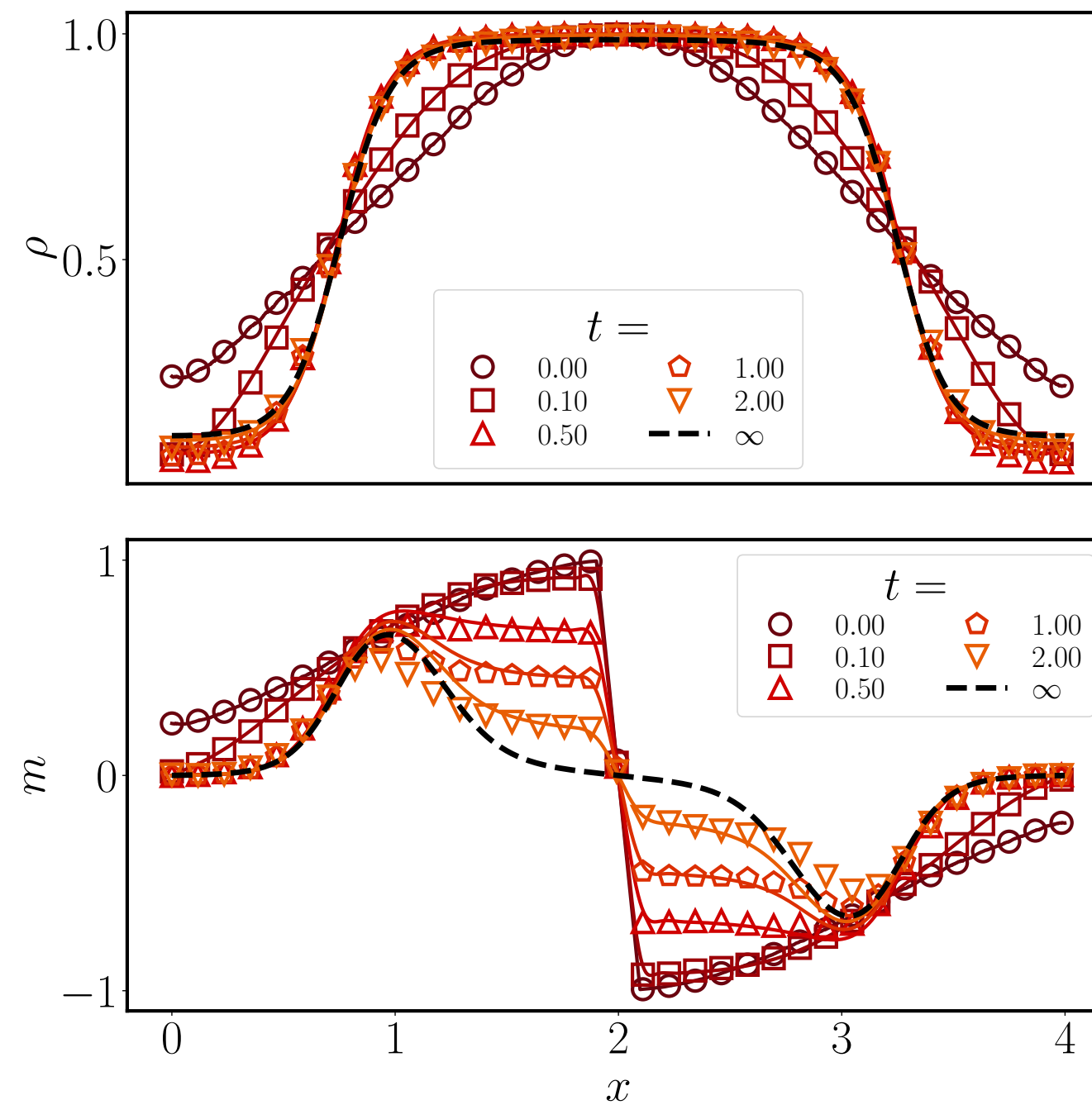


$$\psi_T(X, \pm) = \{0, 1\} \quad \psi_T(X, \pm) \simeq q_{\frac{T}{\tau}} \left(\frac{X}{\ell_d}, \pm \right)$$

$$\rho_t(x) = q_t(x, +) + q_t(x, -)$$

$$m_t(x) = q_t(x, +) - q_t(x, -)$$

$$\begin{aligned} \partial_t \rho &= \partial_x^2 \rho - \text{Pe} \partial_x [m(1 - \rho)] + \ell_d^{-1/2} \partial_x \eta_\rho \\ \partial_t m &= (1 - \rho) \partial_x^2 m + m \partial_x^2 \rho - \text{Pe} \partial_x [\rho(1 - \rho)] - 2m \\ &\quad + \ell_d^{-1/2} (\partial_x \eta_m + 2\eta_f), \end{aligned}$$



Large deviations? Interacting ABP / AOUP / RTP?

Ongoing

Take home message

For a quantitative macro-scale
description of Active matter,
Stay on phase space!



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Two and a half decades of the Macroscopic Fluctuation Theory

The program celebrates twenty-five years of "Macroscopic Fluctuation Theory (MFT)" and its impact on the study of fluctuations and rare events in non-equilibrium many-body systems. The program will bring together researchers from physics, mathematics, and related fields to review key developments and discuss current challenges and future directions.

Topics include large deviations and dynamical phase transitions in interacting particle systems, fluctuating hydrodynamics in classical and quantum settings, integrability structures of the MFT equations, and emerging mathematical problems such as infinite-dimensional Hamilton-Jacobi equations and non-gradient systems. The meeting aims to foster discussion, exchange of ideas, and new collaborations.

A Special Session

The meeting will also celebrate the 80th birthday of Professor Herbert Spohn, honoring his profound and lasting contributions to statistical mechanics.

Eligibility Criteria: PhD students, Post-doctoral fellows, and Permanent Researchers working in the broad area of Statistical Physics.

Organizers |

Davide Gabrielli (*University of L'Aquila*)
Kirone Mallick (*IPhT CEA Saclay*)
Jacopo De Nardis (*Cergy Paris Université*)
Tridib Sadhu (*TIFR, Mumbai*)
Ohad Shpielberg (*University of Haifa*)



<https://www.icts.res.in/program/mftheory>
mftheory@icts.res.in

ICTS is committed to building an environment that is inclusive, non-discriminatory and welcoming of diverse individuals. We especially encourage the participation of women and other under-represented groups.

Invited Speakers* |

Eric Akkermans	Joel Lebowitz (<i>Online</i>)
Christophe Bahadoran	Christian Maes (<i>Online</i>)
Jérémie Bec	Baruch Meerson
Denis Bernard	Hiroki Moriya
Cédric Bernardin	Cesare Nardini**
Lorenzo Bertini	Stefano Olla
Eldad Bettelheim	Arnab Pal
Gioia Carinci	Punyabrata Pradhan
Raphaël Chétrite	Kabir Ramola
Alberto De Sole	Ellen Saada
Abhishek Dhar	Sanjib Sabhapandit
Bernard Derrida	Makiko Sasada
Benjamin Doyon	Tomohiro Sasamoto
Pablo Ferrari	Grégory Schehr
Chiara Franceschini	Timo Schorlepp
Cristian Giardinà	Gunter Schütz
Benjamin Guiselin	Herbert Spohn
Giovanni Jona-Lasinio (<i>Online</i>)	Frédéric van Wijland**
Tomasz Komorowski	Takato Yoshimura
Paul Krapivsky	Johannes Zimmer
Manas Kulkarni	
Anupam Kundu	
Jorge Kurchan**	

*Additional invited speakers awaiting confirmation
**to be confirmed

Application Deadline:
31 May 2026

28 Sept - 9 Oct 2026
Ramanujan Hall, ICTS
Bengaluru

ICTS, Bengaluru.

Sep 28 - Oct 9, 2026

Registration open till May 31st