



# 首届致远学术节 学生科研成果展示

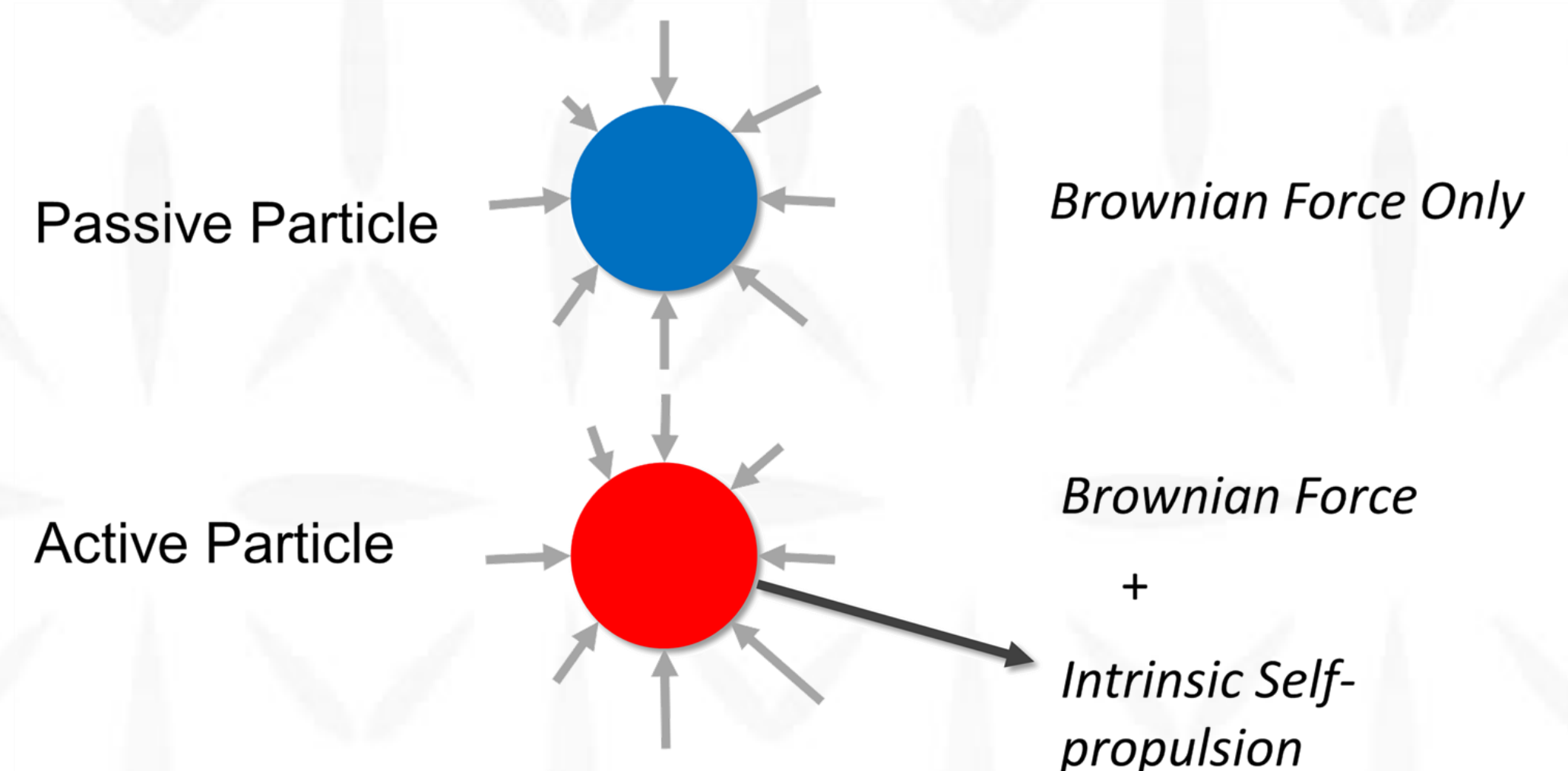
## Influence of Activity on Colloidal Gel

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### Introduction

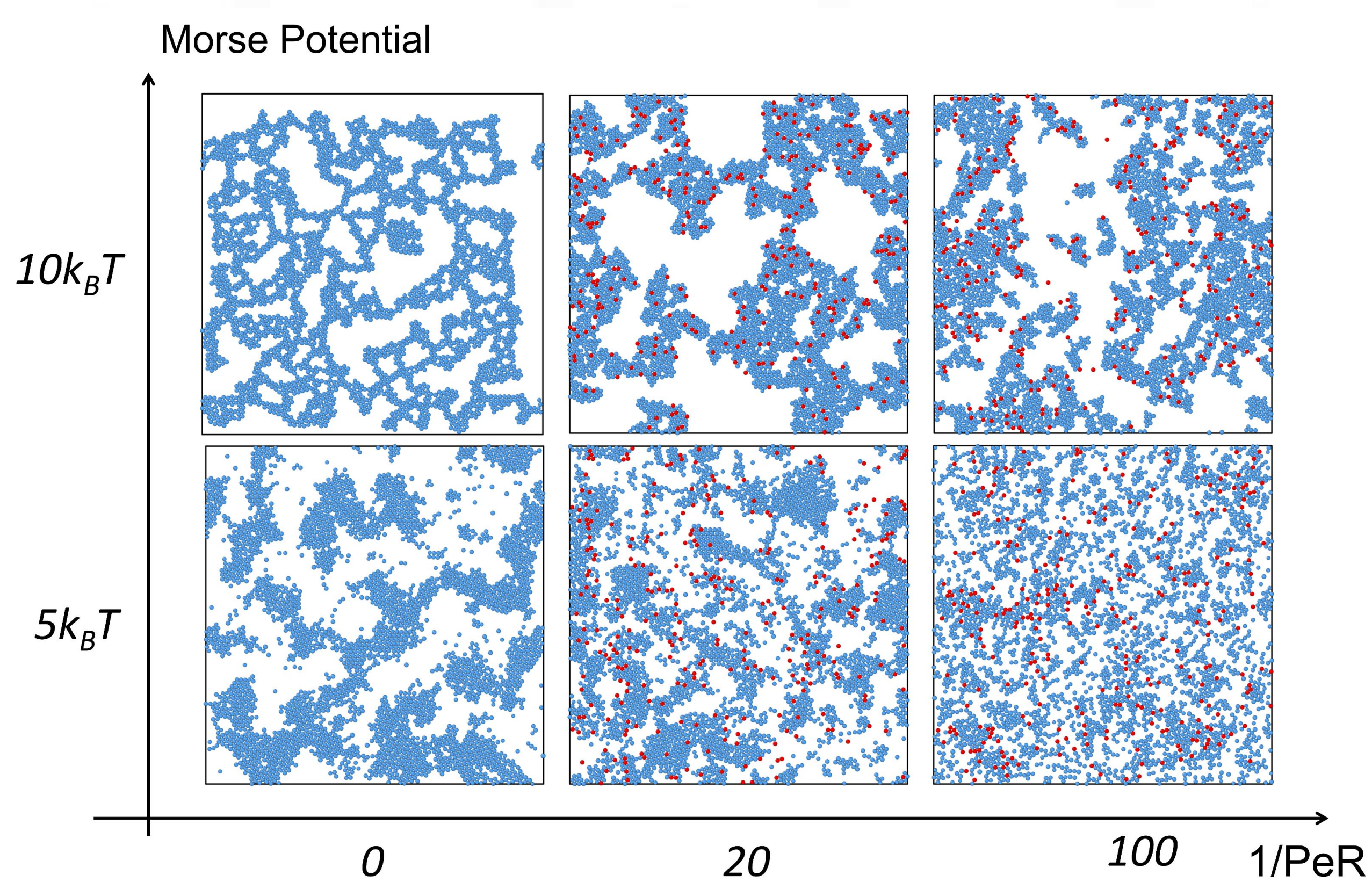
Colloidal gels are a class of gels consisting of attractive particles that form an interconnected percolating network. In biological systems, some colloidal particles can be active (such as bacteria with flagella) in the sense that they can convert chemical energy into self-propulsion<sup>1</sup>.



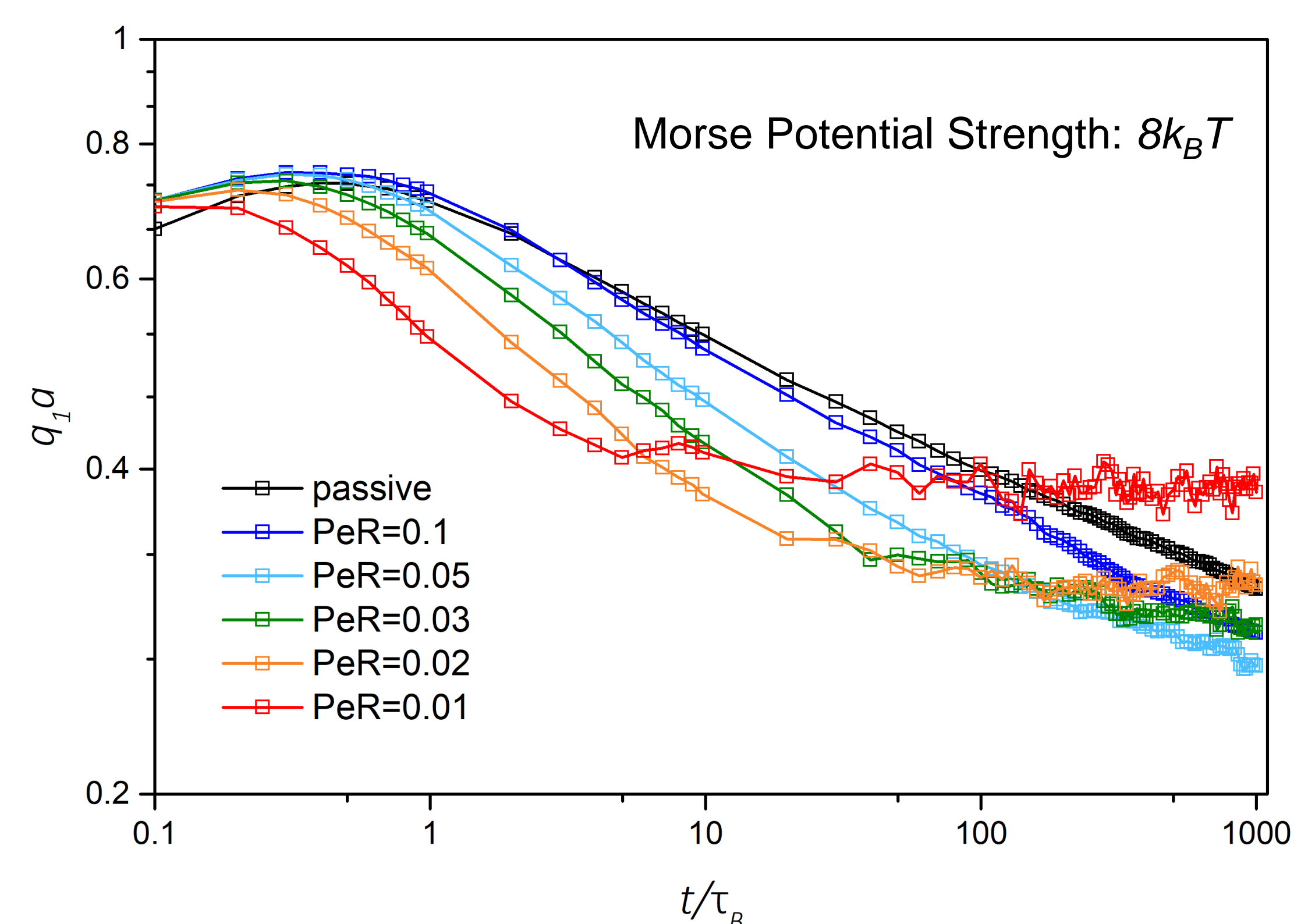
### Methods

- Brownian Dynamics Simulation of 2D active-passive Morse particle mixture;
- Varied Péclet Number of active particle and Morse potential magnitude;
- Structure factor was calculated to characterize system state.

### Results



Snapshots of system with different rotational Péclet number ( $PeR$ , in our systems lower indicates more active) of active particles and Morse potential (interparticle attraction strength).



First moment of structure factor ( $q_1$ ) of active-passive mixed systems with different  $PeR$ , and a passive system as reference.

### Discussion & Future works

- Active particles accelerate the phase separation process of colloidal gel kinetically, but increase disorder of the final steady state;
- Strong interparticle attraction weakens the destruction effect to gel network;
- In the future, we will explore how other factors, such as area fraction or proportion of active particles influence the active-passive colloidal gels.

### References

[1]: Ramaswamy, S. (2010). The mechanics and statistics of active matter

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