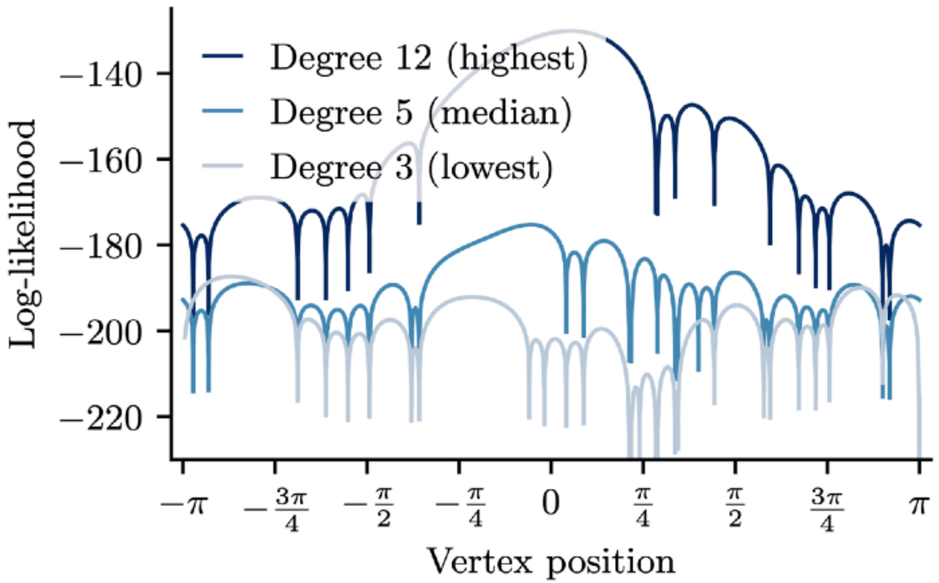
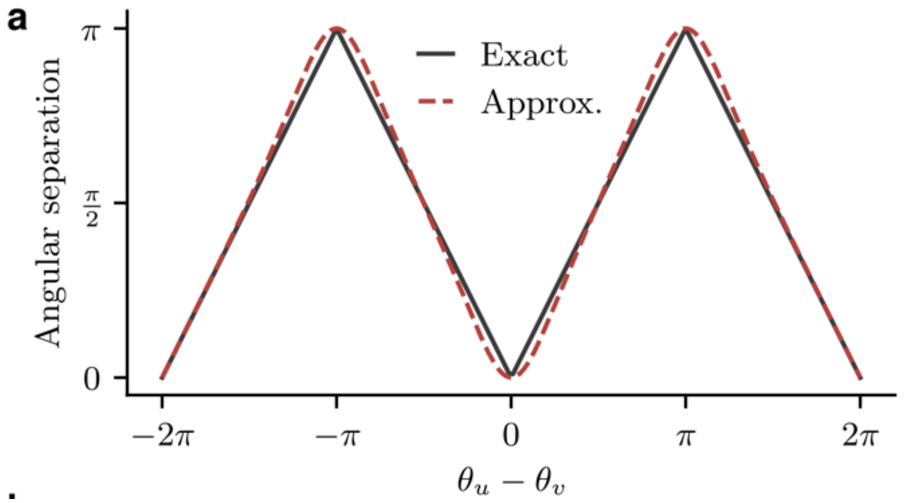
Challenges

Heterogeneous random geometric graph models are prime candidates to model real networked complex systems.

But they rely heavily on our capacity to find high-quality embeddings of the original datasets.

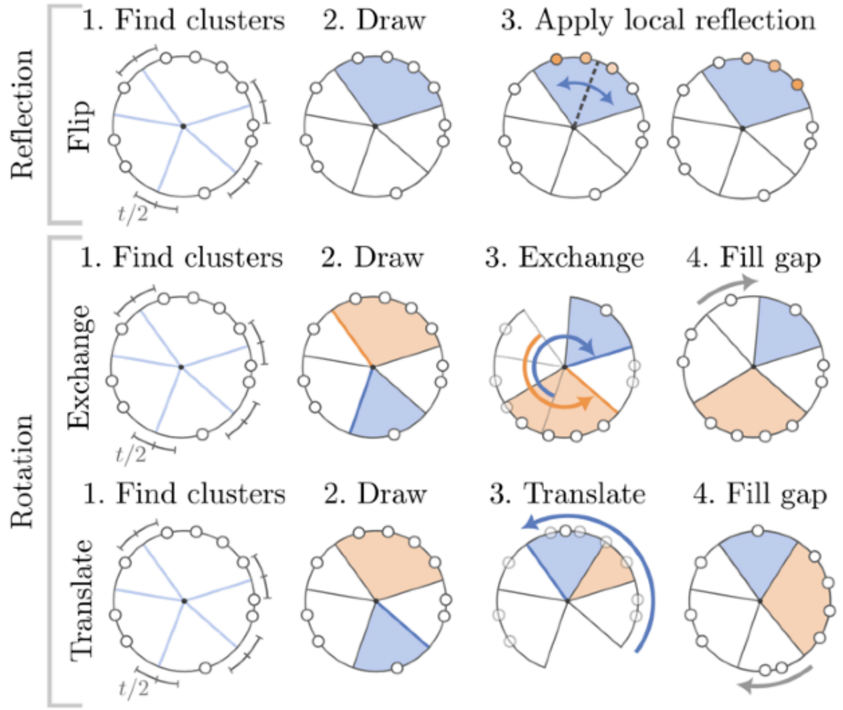
- ▷ Difficult optimization problem
  - rugged landscape
  - numerous symmetries (rotation, reflection, graph automorphisms)
  - gradient not always well defined
- ▷ Out-of-the-box solutions do not work well
  - Hamiltonian Monte Carlo
  - gradient descent
- ▷ Current state-of-the-art embedding methods
  - rely on heuristics
  - do not provide uncertainties (loglikelihood maximization)





Challenges: some solutions

Leverage the specificities of the model to design better sampling algorithm.



Better mixing and exploration than standard sampling algorithms.