



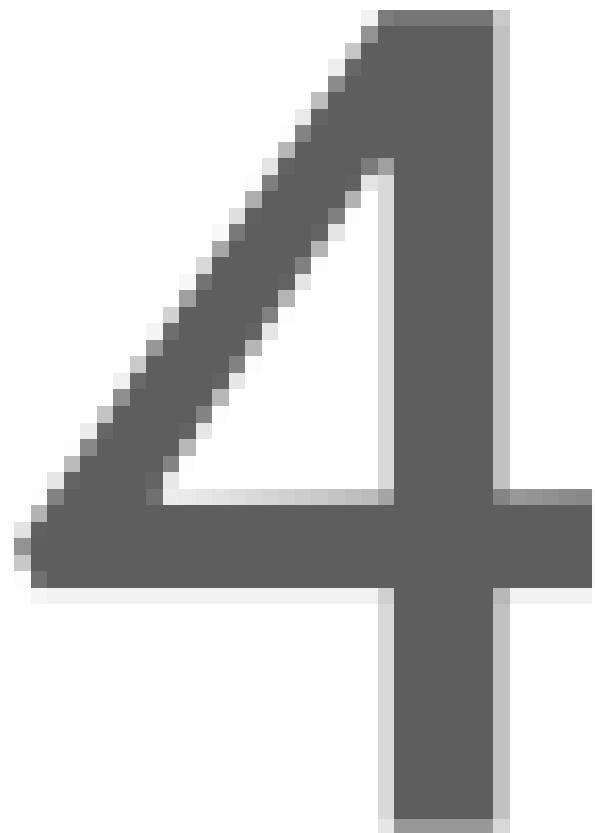
Siddhartha Mishra (MIT/Alfi) Summer School





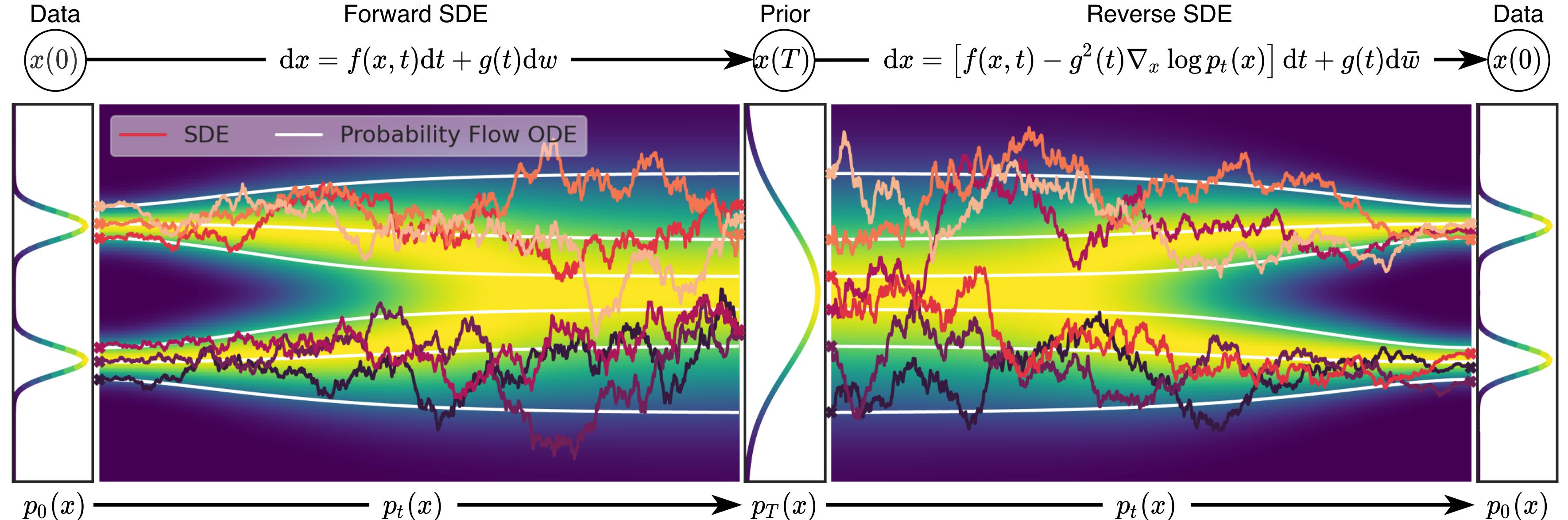
*Diffusion models are just normalizing flows trained in a*

*“simulation-free” way by score/noise-matching!*



Back to diffusion: the probability flow of  $E$

For any diffusion process, there exists a corresponding deterministic process whose trajectories share the same marginal probability densities  $p(x_t)$  as the SDE [Song et al 2021]



# Probability flow ODE

$$dx = \left[ f(x, t) - \frac{1}{2} g^2(t) \nabla_x \log p_t(x) \right] dt$$

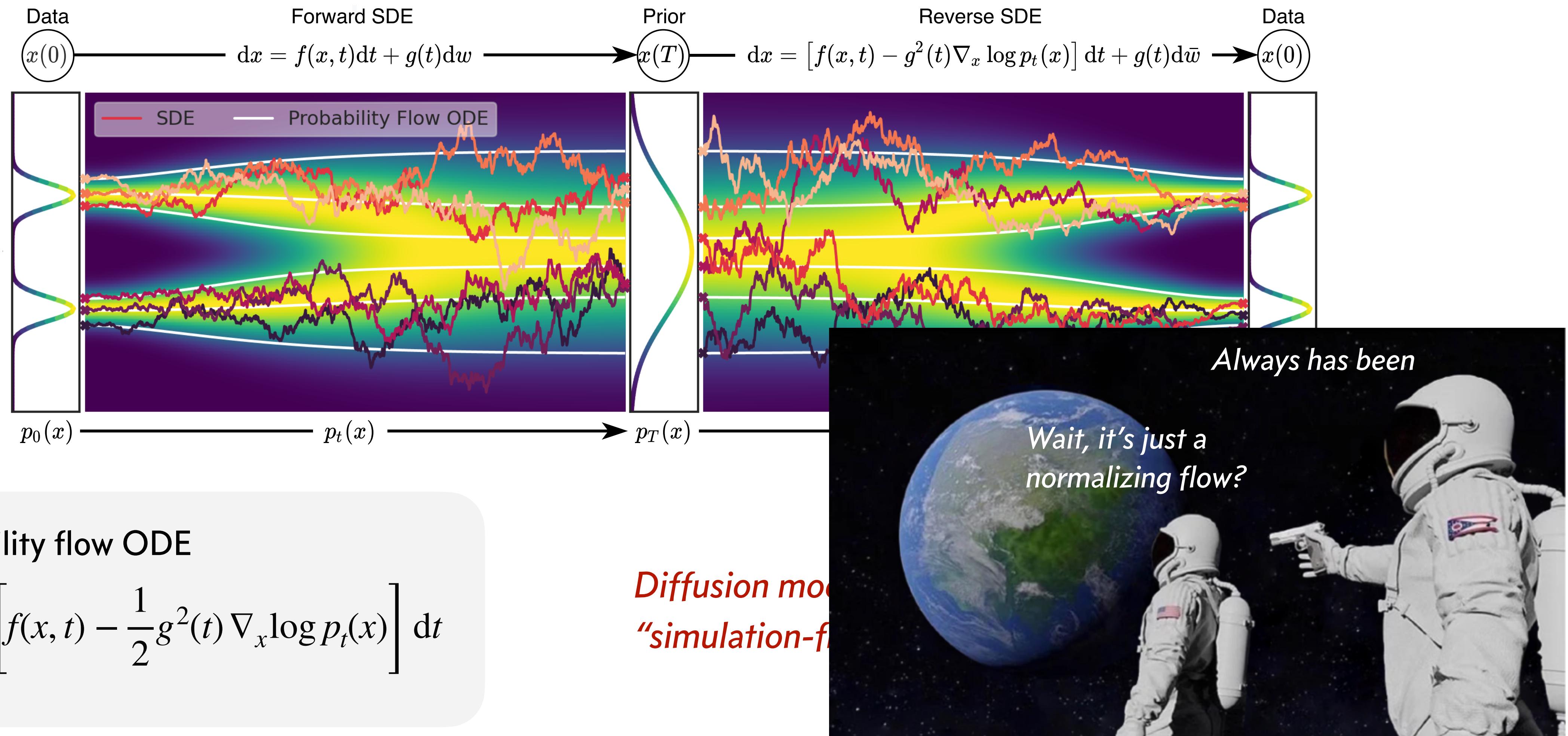
*Always has been*

*Wait, it's just a  
normalizing flow?*



# Back to diffusion: the *probability flow ODE*

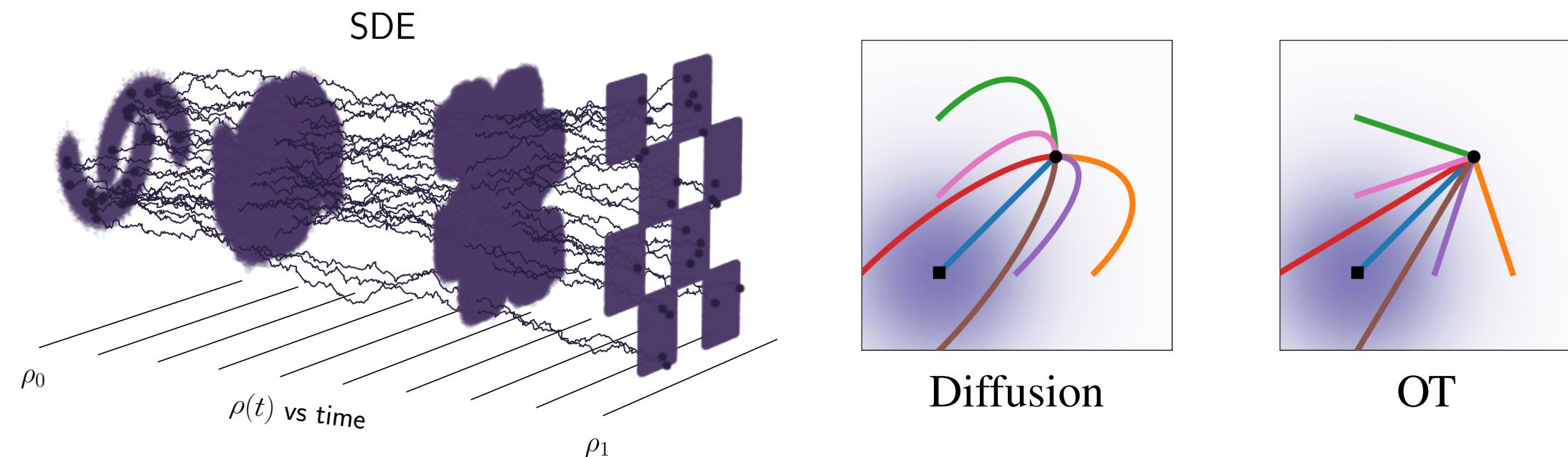
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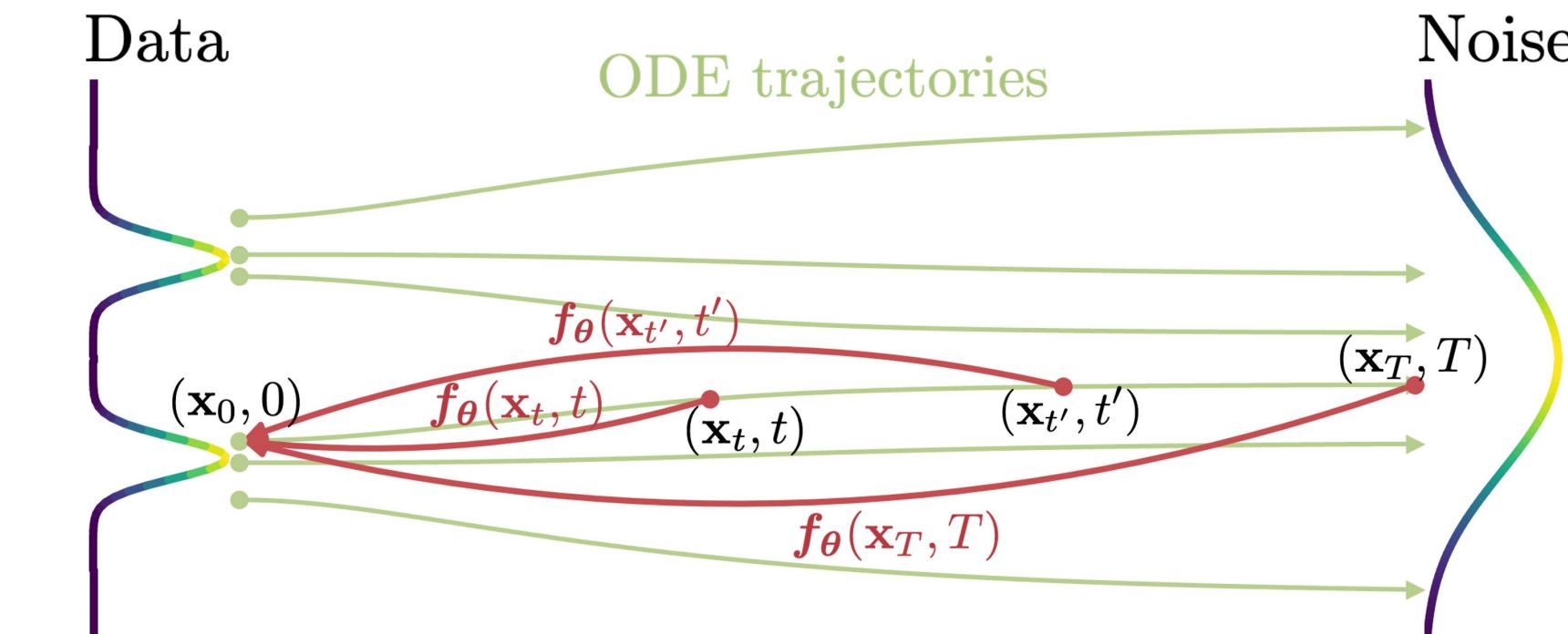
# Iterative refinement, interpolants, consistency, ...

Empirical success of diffusion models has led to many new formulations and methods of training

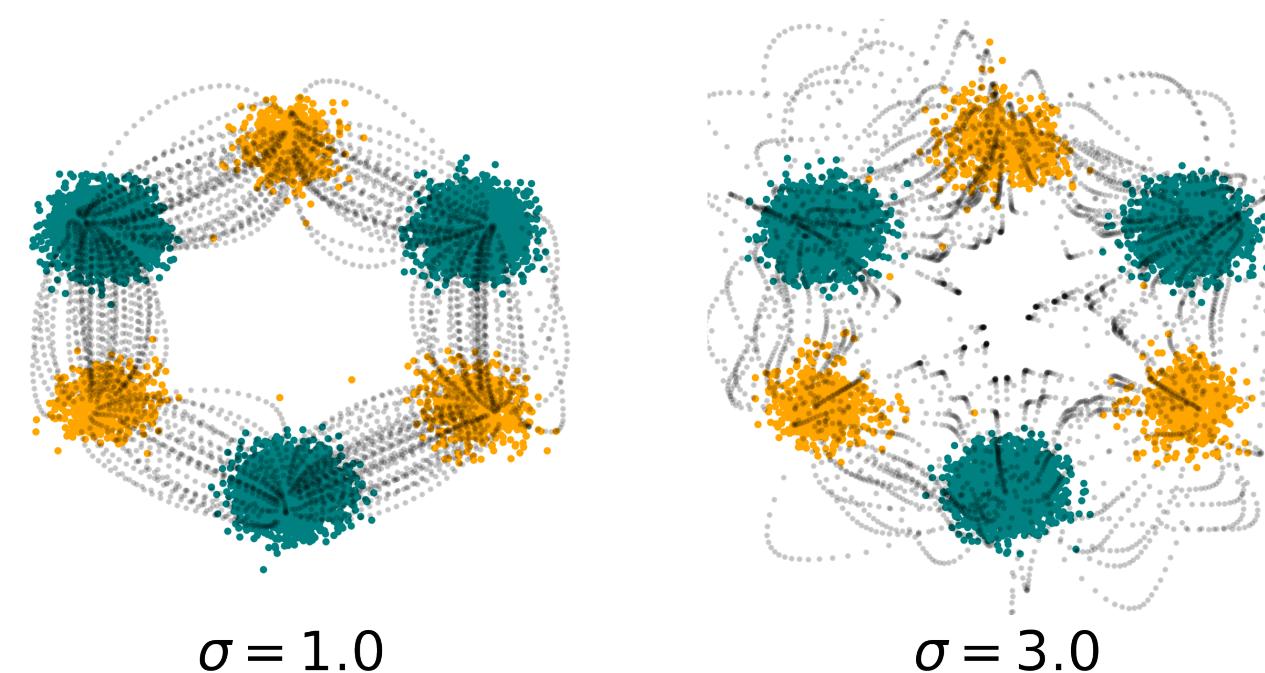
## Stochastic interpolants and flow matching



## ODE trajectory consistency, Fokker-Planck regularization, ...



## Diffusion Schrödinger's bridges



## Generative models inspired by other physical processes

