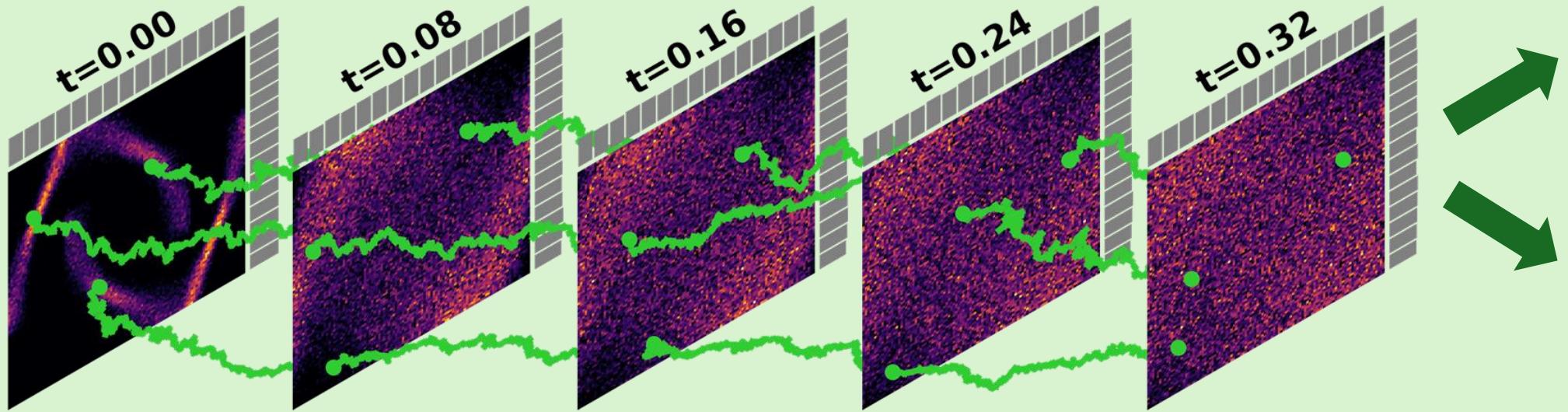
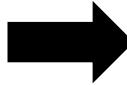


Classification-Diffusion Copula

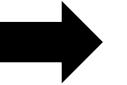
SDE-driven forward process



Dependent copula



Only dependence is forgotten



Independent copula

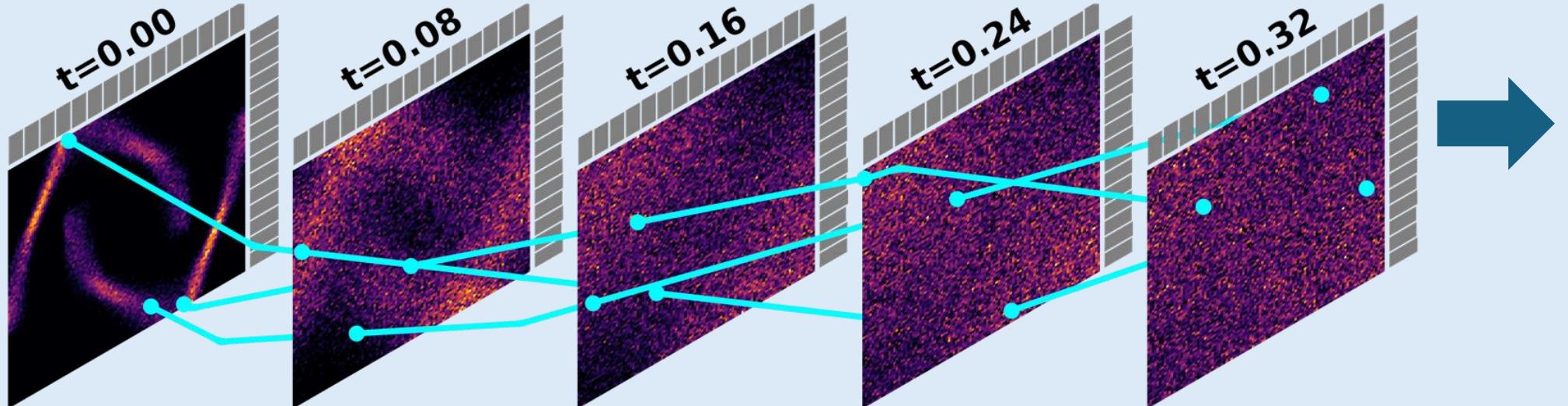
Density evaluation in one function call via class probabilities on dependence

$$c(\mathbf{u}) = \frac{\mathbb{P}(\text{time} = 0 | \mathbf{u})}{\mathbb{P}(\text{time} = \infty | \mathbf{u})}$$

Scores-based sample generation

$$\nabla_{\mathbf{u}} \frac{\log \mathbb{P}(\text{time} = t | \mathbf{u})}{\log \mathbb{P}(\text{time} = \infty | \mathbf{u})}$$

Reflection process based on random initial velocity



Reflection Copula

Predict velocity given location and time

$$v(\mathbf{u}, t) = \mathbb{E}[\quad | \mathbf{u}_t = \mathbf{u}]$$

Follow reversed velocity predictor from uniform to generate dependent samples

$$U \sim \text{Unif} \rightarrow -v(\mathbf{u}, t) \rightarrow \mathbf{u} \sim c(\mathbf{u})$$