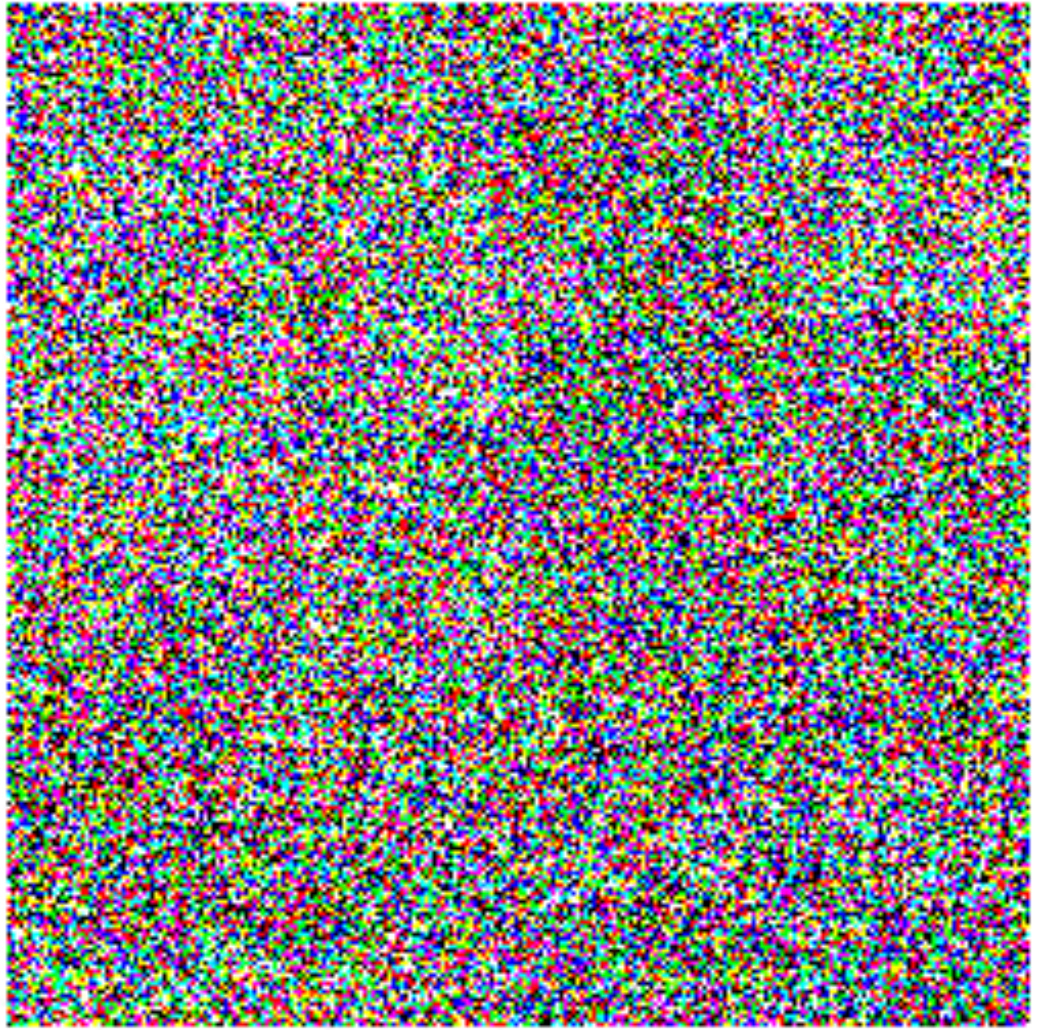
/70

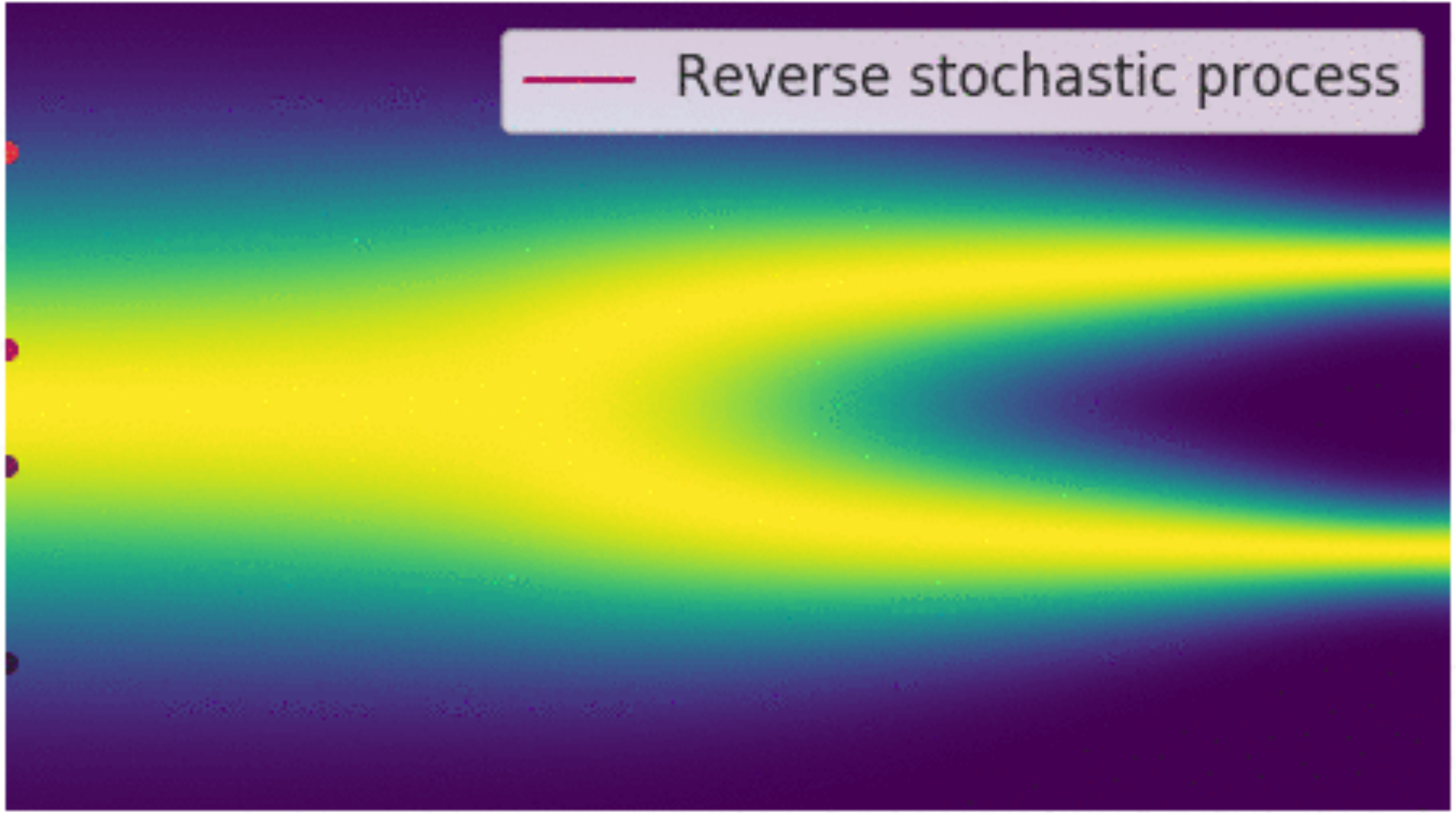
44

The reverse SDE

The reverse process satisfies a reverse-time SDE that can be derived from the forward SDE and the score of the marginal distribution, $\nabla_{x_t} \log q(x_t)$

$$\mathrm{d}x_t = \left[-\frac{1}{2}\beta(t)x_t - \beta(t)\,\nabla_{x_t}\log q\left(x_t\right) \right] \mathrm{d}t + \sqrt{\beta(t)}\mathrm{d}w_t$$

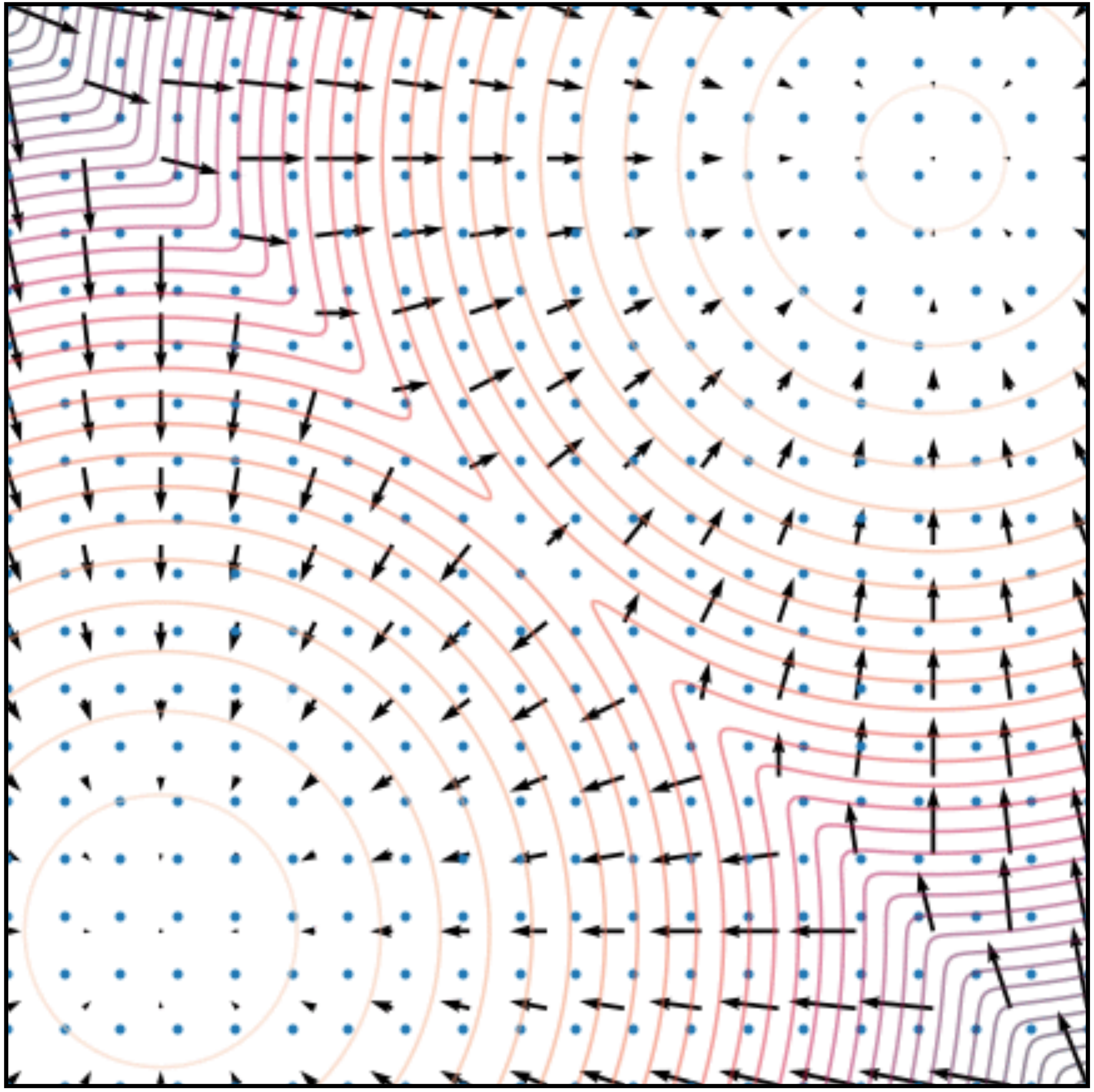


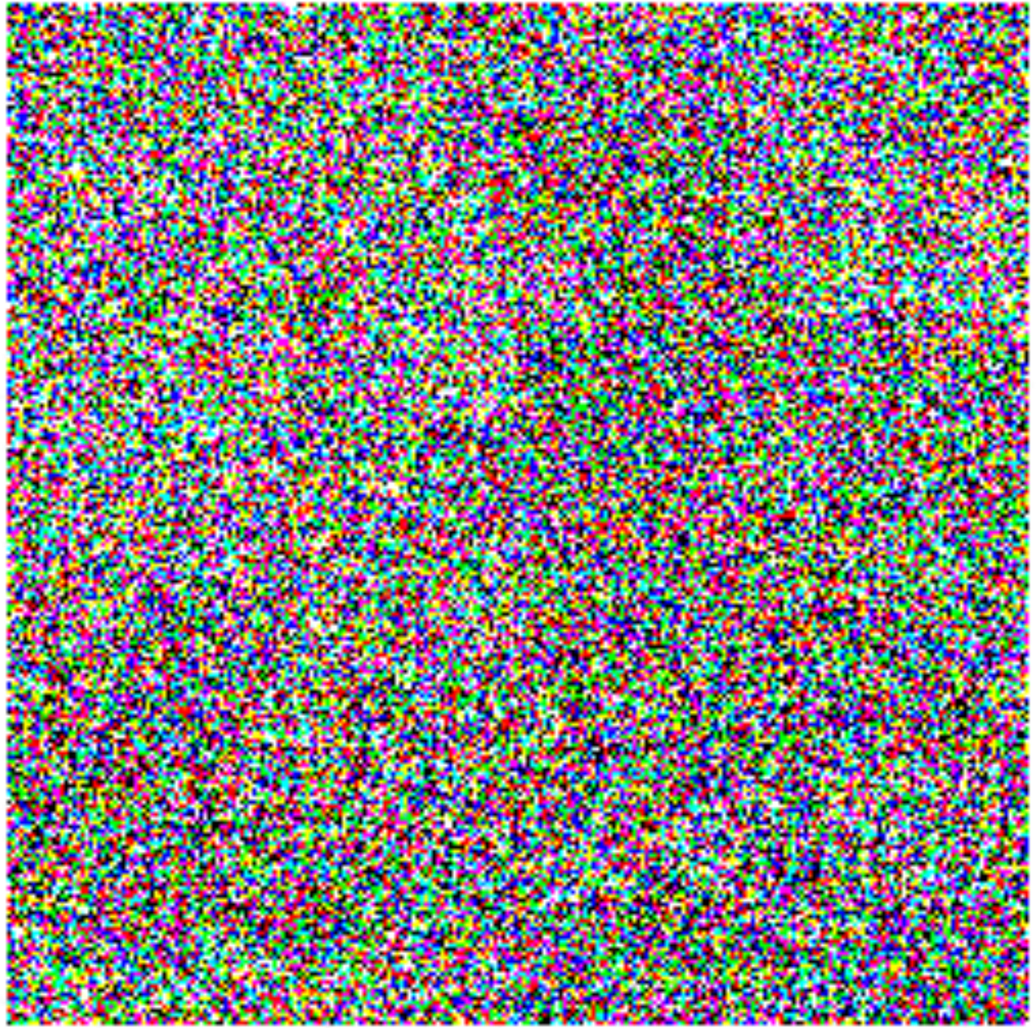


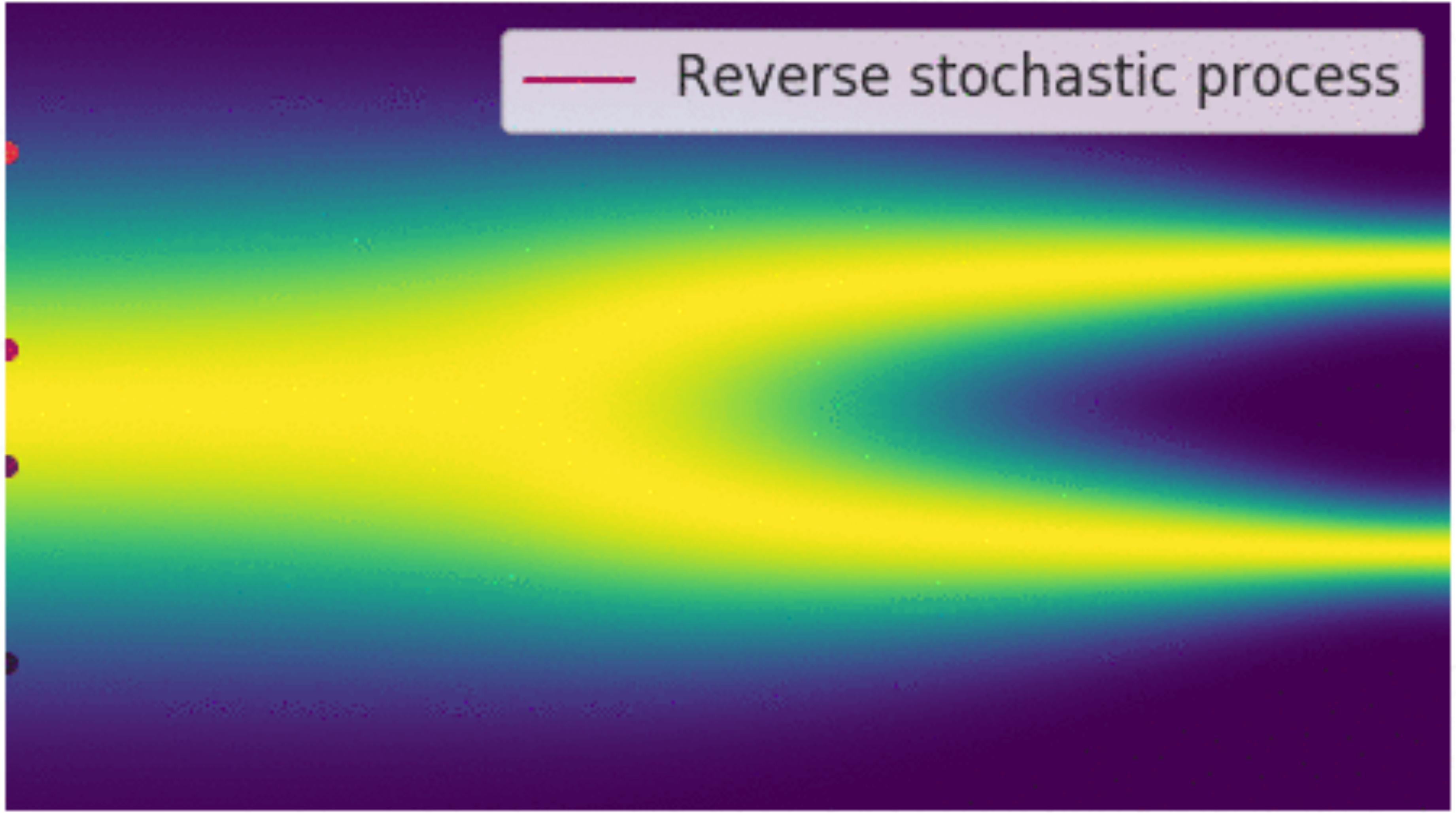
Reverse stochastic process

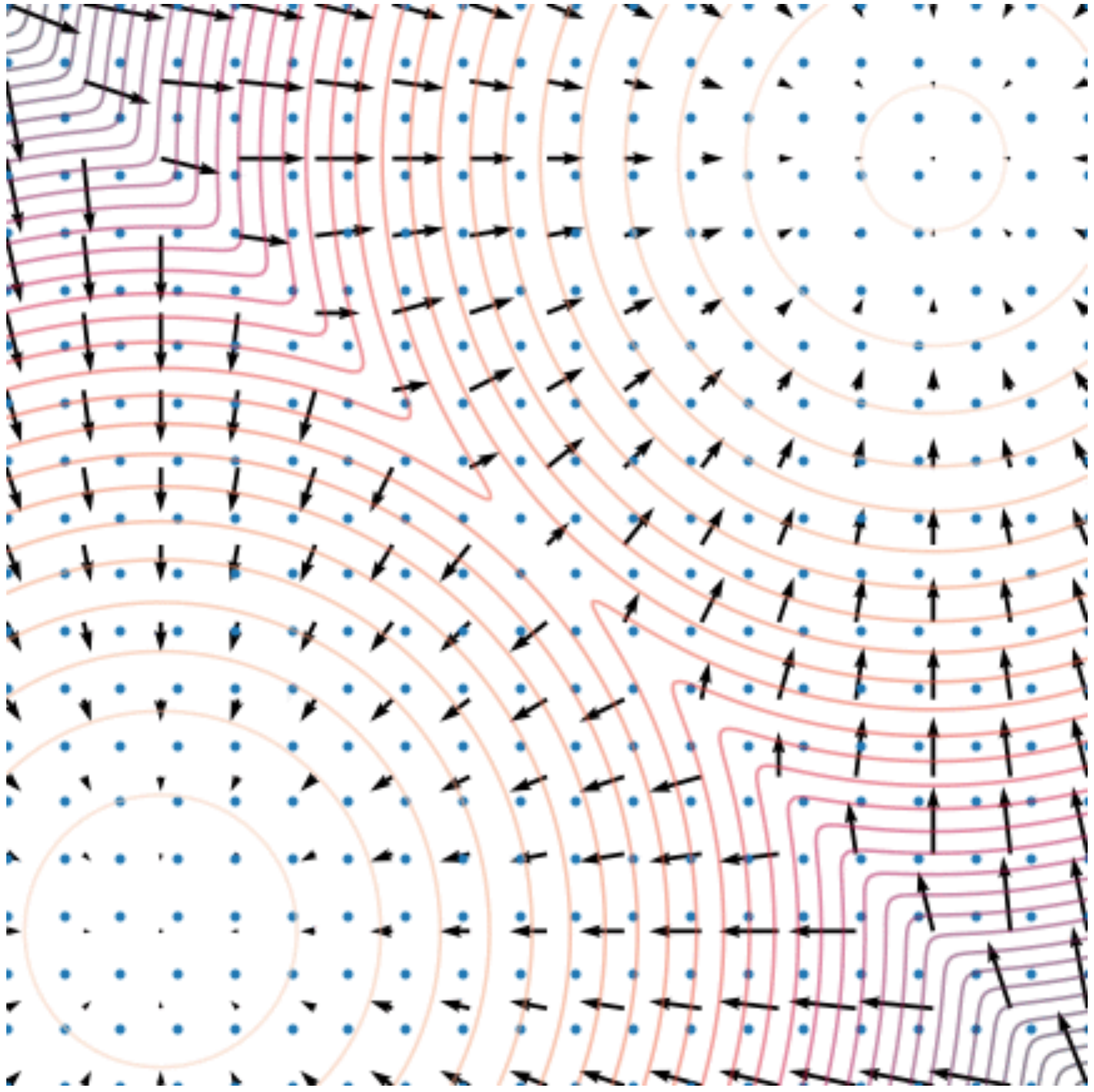
[Song et al 2021]

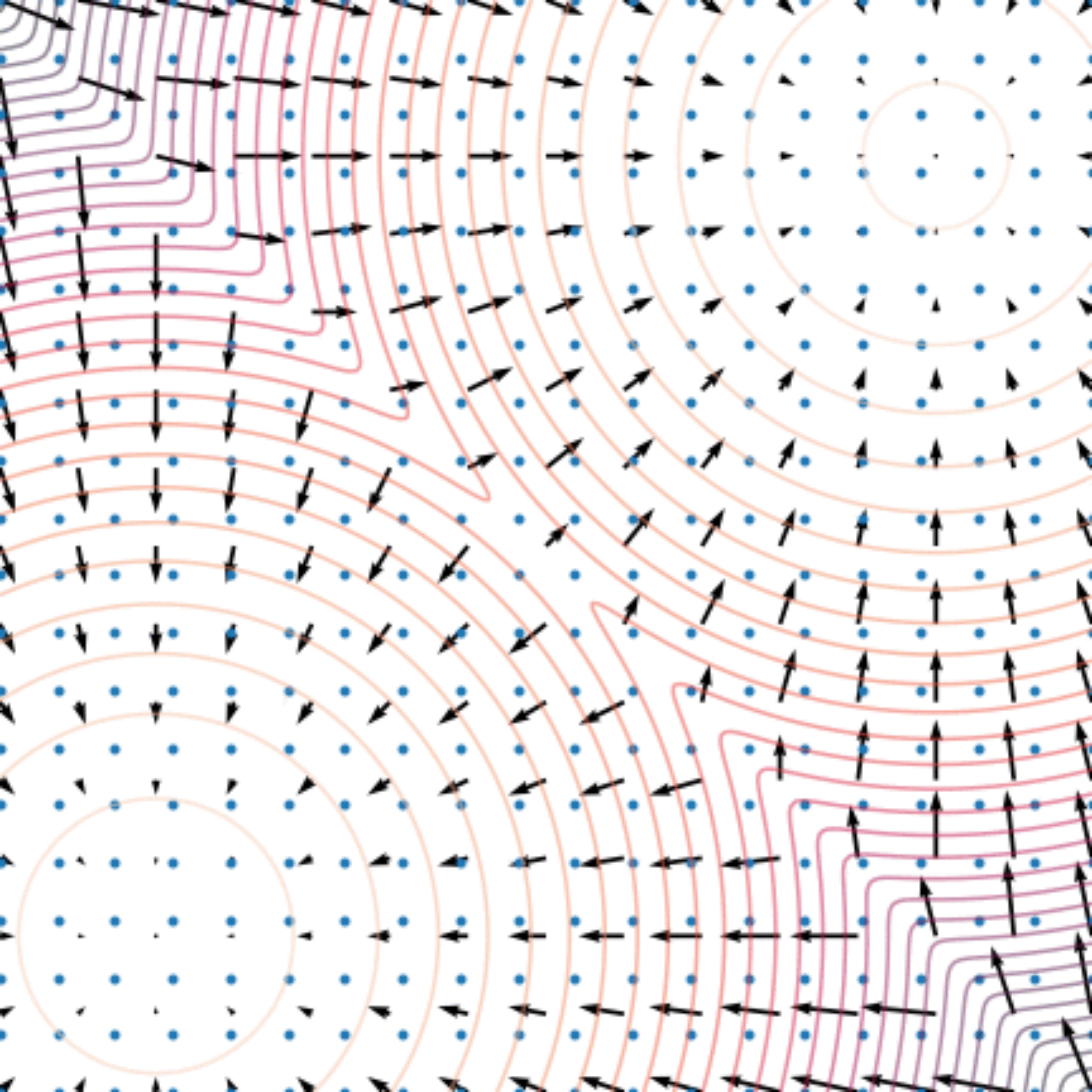
https://yang-song.net/blog/2021/score/






Reverse stochastic process

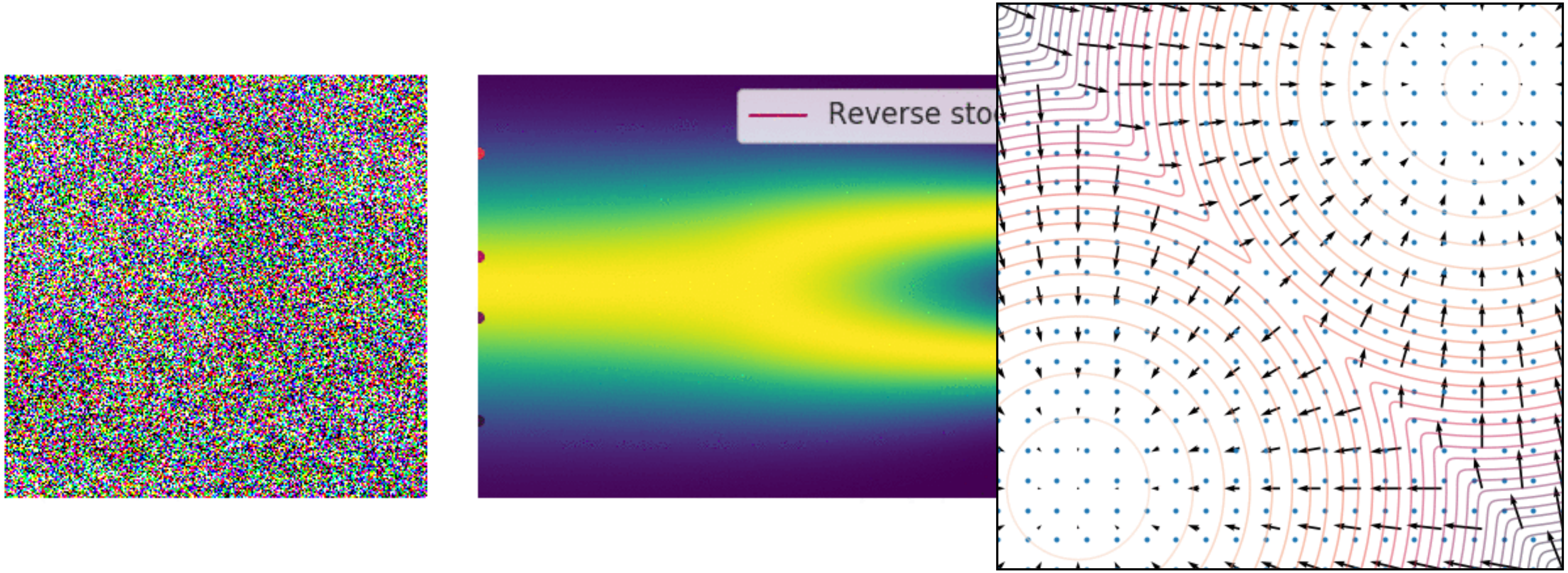




The reverse SDE

https://yang-song.net/blog/2021/score/

The reverse process satisfies a reverse-time SDE that can be derived from the forward SDE and the score of the marginal distribution, $\nabla_{x_t} \log q(x_t)$



$$dx_t = \left[-\frac{1}{2}\beta(t)x_t - \beta(t)\nabla_{x_t}\log q\left(x_t\right)\right]dt + \sqrt{\beta(t)}dw_t$$

Denoising score matching

Need to compute the score $\nabla_{x_t} \log q(x_t)$

The *conditional* score $\nabla_{x_t} \log q(x_t \mid x)$ can be computed using the diffusion kernel

$$\nabla_{x_t} \log q(x_t \mid x) = -\frac{(x_t - x)}{\sigma_t^2} = -\frac{\epsilon}{\sigma_t}$$