

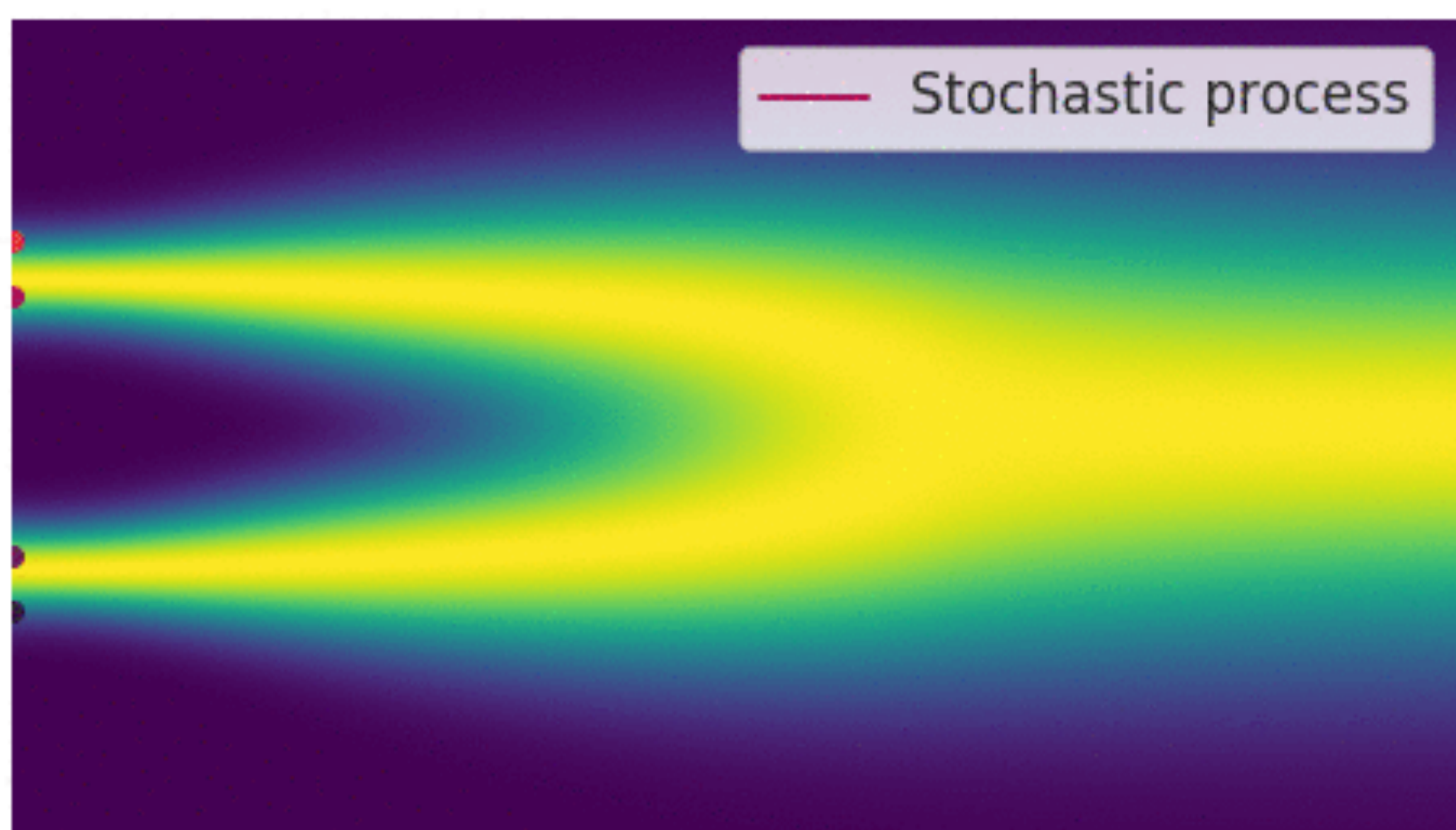
Siddhant Mishra-Sharma (MIT/AI FI) Summer School

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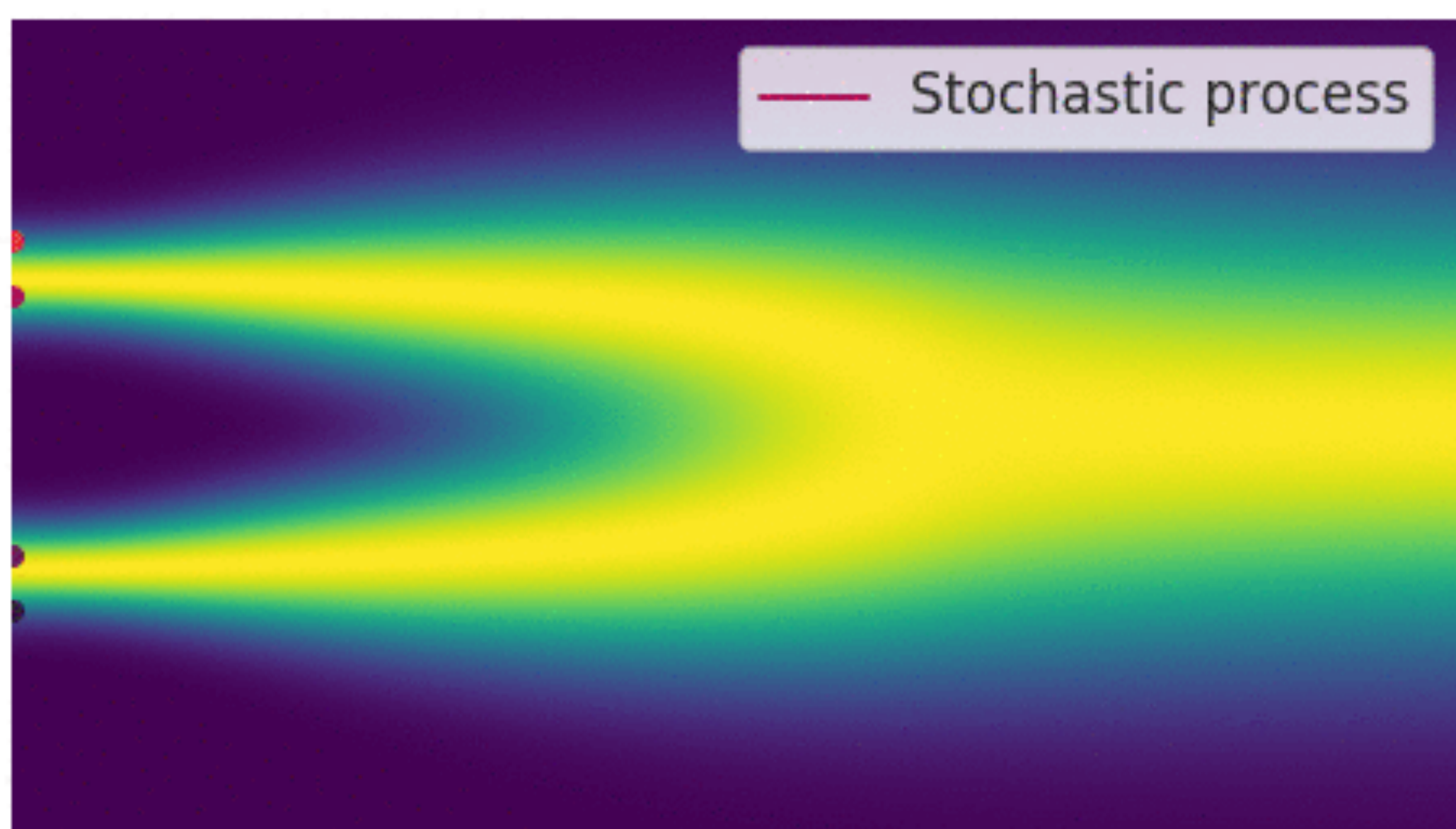
Continuous-time/SDE formulation



$$dx_t = -\frac{1}{2}\beta(t)x_t \, dt + \sqrt{\beta(t)} \, dv_t$$

The forward diffusion process defined by an SDE

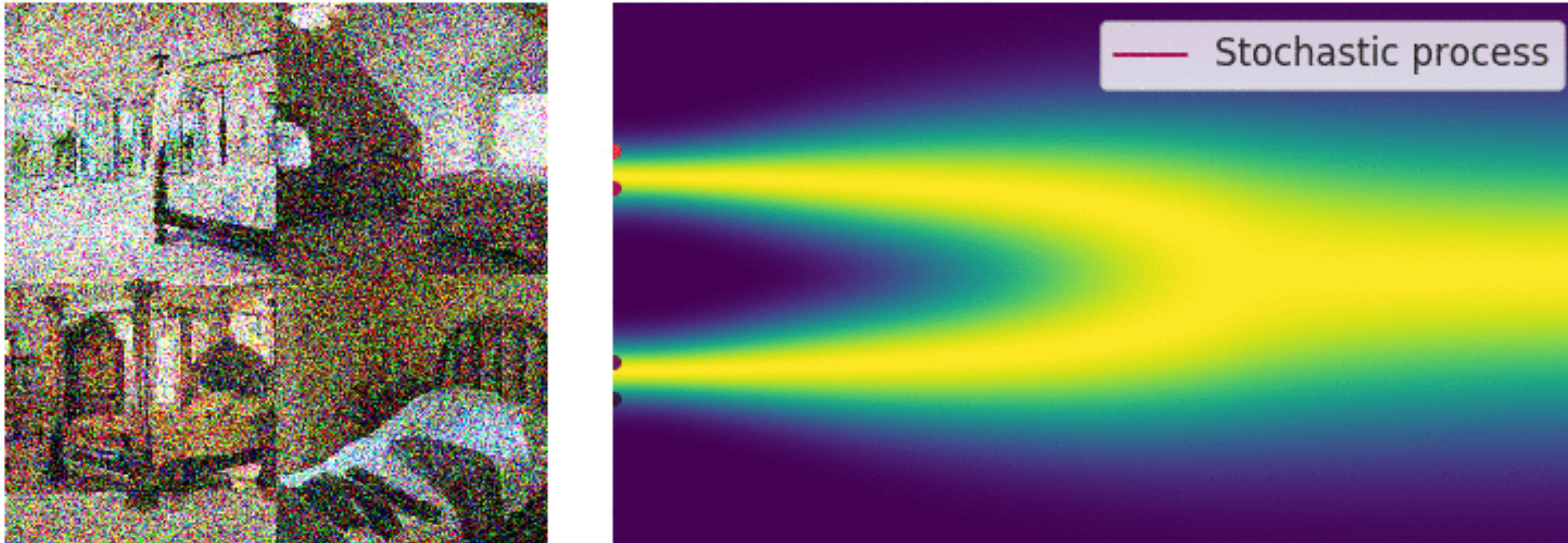
[Song et al 2021]



Continuous-time/SDE formulation

The forward diffusion process defined by an SDE

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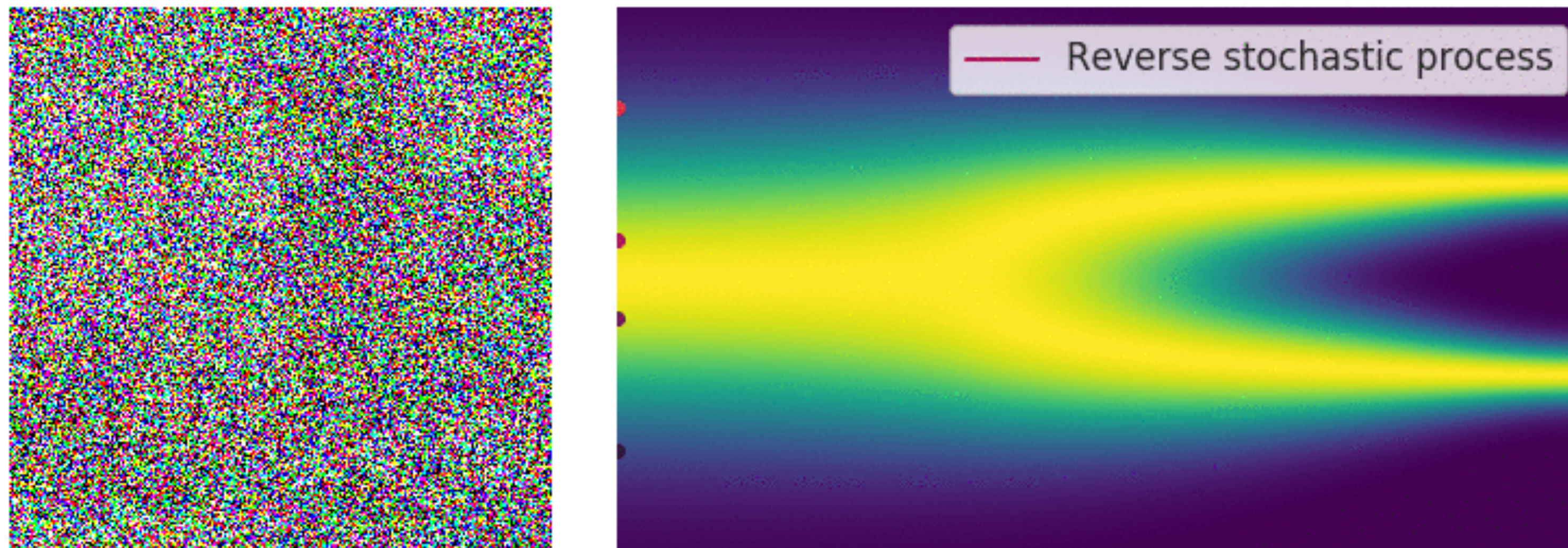


$$dx_t = -\frac{1}{2}\beta(t)x_t dt + \sqrt{\beta(t)}dw_t$$

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, $\nabla_{x_t} \log q(x_t)$

[Song et al 2021]



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