a. Brownian Motion

$$\mathrm{d}X_t = v\left(t, X_t\right)\mathrm{d}t + \sigma \mathrm{d}\mathbb{W}_t$$

Wiener process

● particle

example trajectory
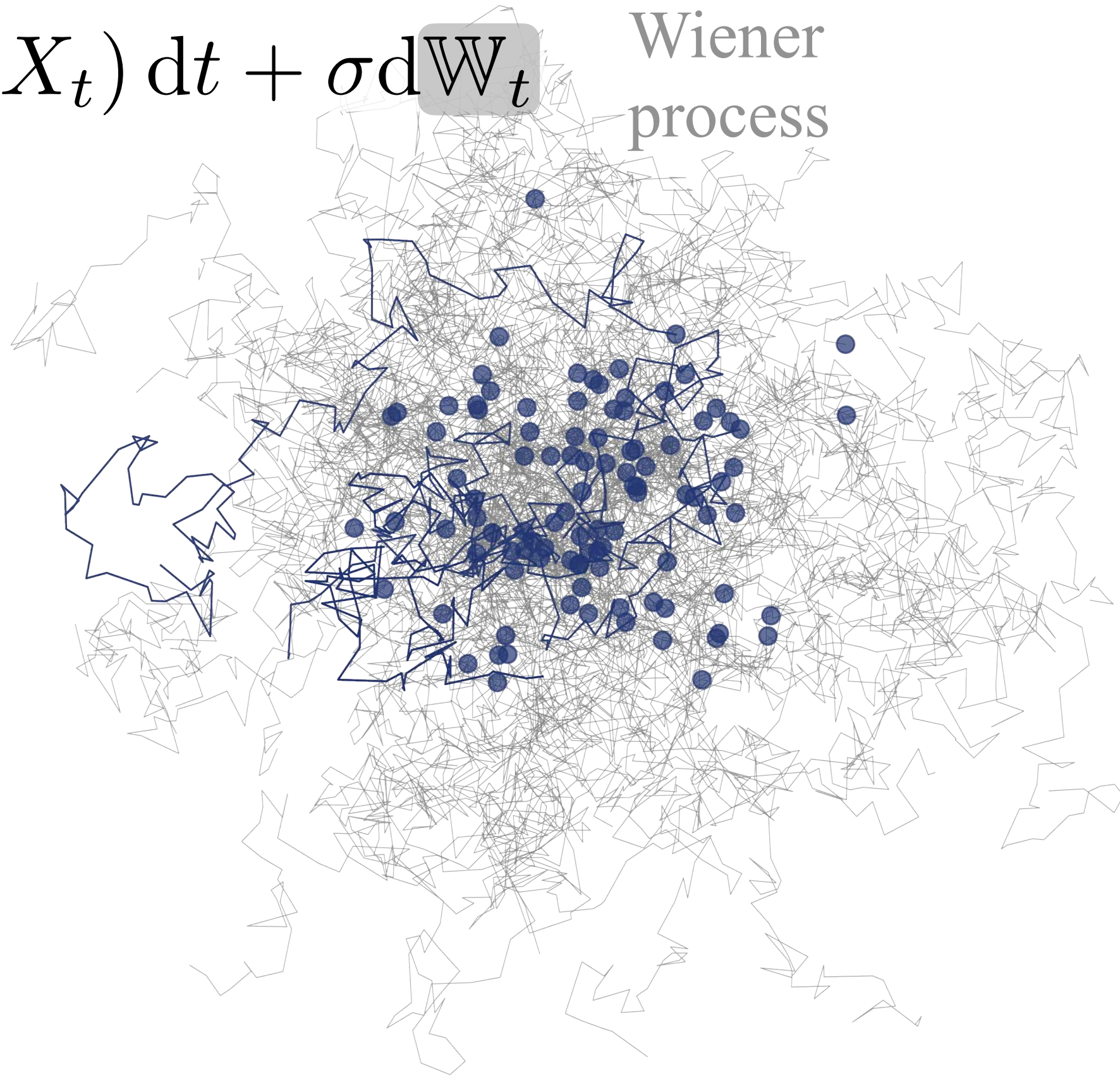
b. Particle Evolution *with external force f and noise g*

$$\mathrm{d}X_t = \left[f\left(t, X_t\right) + g(t)v\left(t, X_t\right)\right]\mathrm{d}t + g(t)\mathrm{d}\mathbb{W}_t$$

$f(t, X_t)$