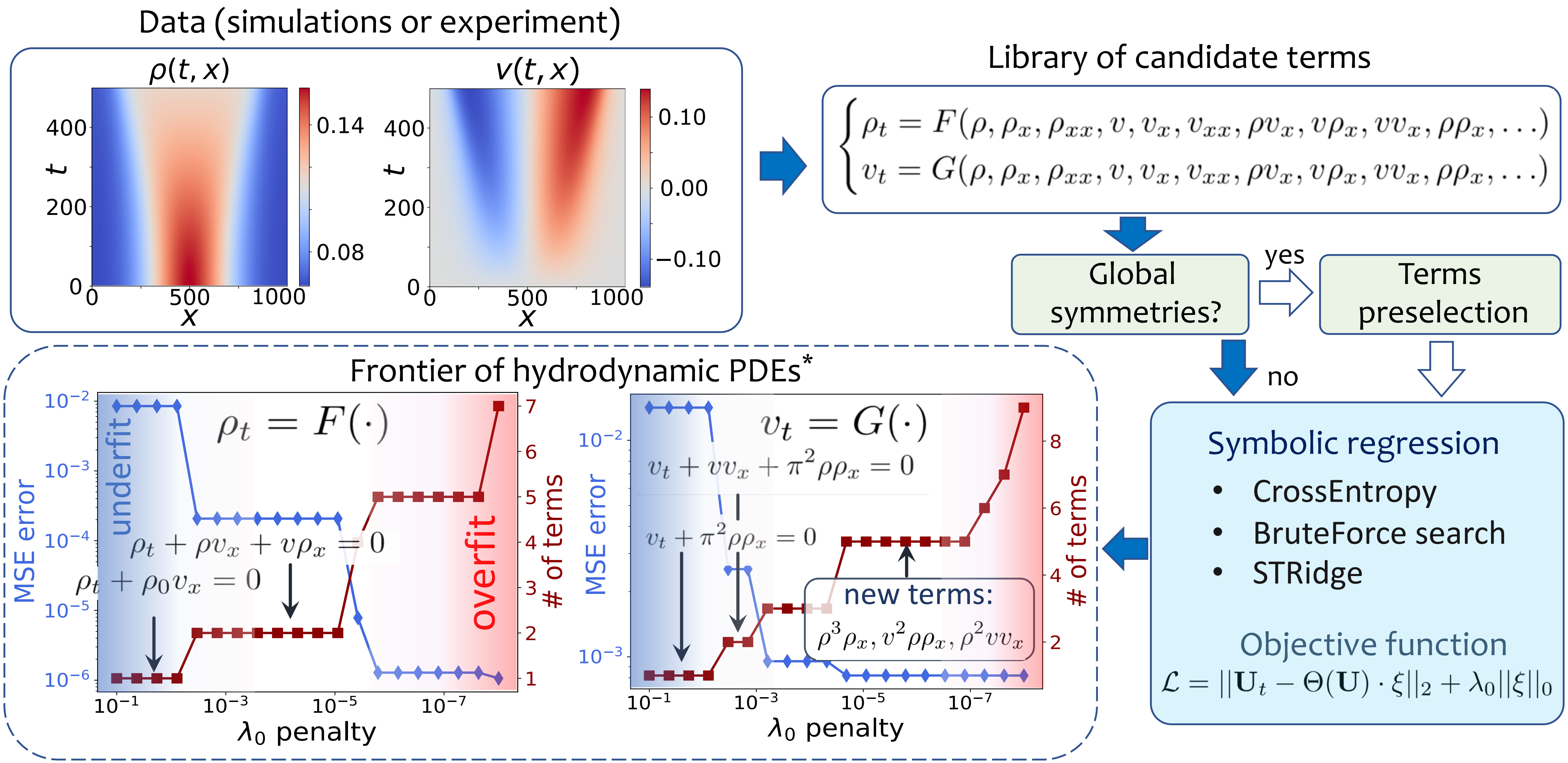

Discovered equations:

- Free fermions in 1D* (proved analytically)

$$v_t + vv_x + \pi^2\rho\rho_x = b_1\rho^3\rho_x + b_2 v^2\rho\rho_x + b_3\rho^2 vv_x$$

(tight-binding dispersion)

$$v_t + 5vv_x - v^2(\log\rho)_x + \beta^2\pi^6\rho^5\rho_x = 0$$

(quartic dispersion)

- Strongly-interacting fermions (Fermi-Hubbard)

$$v_t + vv_x + \kappa(U)\rho\rho_x = 0$$

- Heisenberg spin chain (high-T domain wall)

$$u_t + auu_x = Du_{xx}, \quad u = \langle S^z(t,x) \rangle$$