Abstract: In this talk we review some results on stochastic symplectic methods for stochastic Hamiltonian systems, including stochastic generating functions and stochastic Hamilton-Jacobi theory. We investigate the canonical form and the stochastic symplectic structure of stochastic nonlinear Schrödinger equations (SSEs), and show that the symplectic Runge-Kutta semidiscretization for SSEs in time preserves charge conservation law. We present stochastic multi-symplectic methods for stochastic Maxwell equations, and show that these methods preserve physical properties of equations.

References