Stochastic variational principles for the collisional Vlasov-Maxwell and Vlasov-Poisson equations
Tomasz Tyranowski (Max Planck Institute for Plasma Physics)
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In this work we recast the collisional Vlasov-Maxwell and Vlasov-Poisson equations as systems of coupled stochastic and partial differential equations, and we derive stochastic variational principles which underlie such reformulations. We also propose a stochastic particle method for the collisional Vlasov-Maxwell equations and provide a variational characterization of it, which can be used as a basis for a further development of stochastic structure-preserving particle-in-cell integrators.