The Hamiltonian mechanics of stochastic acceleration[1] JOSHUA
BURBY, Princeton University, ANDREY ZHMOGINOV, University of California,
Berkeley, HONG QIN, Princeton Plasma Physics Laboratory, University of Science
and Technology of China — We show how to find the physical Langevin equation
describing the trajectories of particles undergoing collisionless stochastic accelera-
tion. These stochastic differential equations retain not only one-, but two-particle
statistics, and inherit the Hamiltonian nature of the underlying microscopic equa-
tions. This opens the door to using stochastic variational integrators to perform
simulations of stochastic interactions such as Fermi acceleration. We illustrate the
theory by applying it to two example problems.

Joshua Burby
Princeton University

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