1035-60-457 **Houman Owhadi*** (owhadi@caltech.edu), Caltech MC 217-50, 1200 E California Blvd, Pasadena, CA 91125, and **Nawaf Bou-Rabee**. *From Stochastic Variational Integrators to super-diffusive transport at uniform temperature with fluctuation-driven magnetic motors.*

We introduce variational integrators for a class of stochastic mechanical systems driven by Wiener processes by deriving stochastic governing equations from a critical point of a stochastic action.

By applying our integrator to a fluctuation-driven magnetic motor we exhibit a paradigm for isothermal, mechanical rectification of stochastic fluctuations.

The central idea is to transform energy injected by (random/thermal) fluctuations into rigid-body rotational kinetic energy. We show that although directed motion is not possible at uniform temperature, thermal noise can be used to obtain super-diffusive (quasi-ballistic) transport. (Received September 07, 2007)