Abstract Submitted
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**A Hybrid Monte Carlo importance sampling of rare events in Turbulence and in Turbulent Models**[1] GEORGIOS MARGAZOGLOU, LUCA BIFERALE, Univ of Rome Tor Vergata , RAINER GRAUER, Ruhr University Bochum, KARL JANSEN, NIC/DESY Zeuthen, DAVID MESTERHAZY, University of Bern, TILLMANN ROSENOW, NIC/DESY Zeuthen, RAFFAELE TRIPICCIONE, University of Ferrara — Extreme and rare events is a challenging topic in the field of turbulence. Trying to investigate those instances through the use of traditional numerical tools turns to be a notorious task, as they fail to systematically sample the fluctuations around them. On the other hand, we propose that an importance sampling Monte Carlo method can selectively highlight extreme events in remote areas of the phase space and induce their occurrence. We present a brand new computational approach, based on the path integral formulation of stochastic dynamics, and employ an accelerated Hybrid Monte Carlo (HMC) algorithm for this purpose. Through the paradigm of stochastic one-dimensional Burgers' equation, subjected to a random noise that is white-in-time and power-law correlated in Fourier space, we will prove our concept and benchmark our results with standard CFD methods. Furthermore, we will present our first results of constrained sampling around saddle-point instanton configurations (optimal fluctuations).

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