Abstract Submitted
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Persistent Probability Currents in Non-equilibrium Steady States[1] ROYCE ZIA, Iowa State and Virginia Tech, ANDREW MELLOR, MAURO MOBILIA, University of Leeds, BAYLOR FOX-KEMPER, Brown University, JEFFREY WEISS, University of Colorado at Boulder — For many interesting phenomena in nature, from all life forms to the global climate, the fundamental hypothesis of equilibrium statistical mechanics does not apply. Instead, they are perhaps better characterized by non-equilibrium steady states, evolving with dynamical rules which violate detailed balance. In particular, such dynamics leads to the existence of non-trivial, persistent probability currents - a principal characteristic of non-equilibrium steady states. In turn, they give rise to the notion of 'probability angular momentum'. Observable manifestations of such abstract concepts will be illustrated in two distinct contexts: a heterogeneous nonlinear voter model and our ocean heat content.

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