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Nondiffusive transport in electron temperature gradient turbulence KYLE GUSTAFSON[1], Department of Physics, University of Maryland, DIEGO DEL CASTILLO NEGRETE, Oak Ridge National Laboratory, MICHAEL BARNES, Department of Physics, University of Maryland, WILLIAM DORLAND, Department of Physics, University of Maryland — Numerical studies of electron temperature gradient turbulence (ETG) indicate that nonlinear effects boost the observed transport beyond the level expected from quasilinear analysis. In particular, the formation of radially extended streamers seems to facilitate rapid transport. We use the nonlinear gyrokinetic code GS2 to study transport of tracers through streamers embedded in $\mathbf{E} \times \mathbf{B}$ turbulence. In particular, we explore the role of such coherent structures in inducing long particle displacements (Levy-flight), and study the non-Gaussian scaling of the probability density function in space and time. Motivated by previous studies in pressure-gradient driven plasma turbulence and flows with similar topology, we explore the use of fractional diffusion operators to model transport by streamers in ETG turbulence. Fractional diffusion operators are integro-differential operators providing a natural mathematical framework to describe non-Gaussian and non-Markovian (memory-dependent) transport processes.

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