Abstract Submitted
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On a novel approach to anomalous transport in turbulent fluid and plasma DHURJATI PRASAD DATTA, Department of Mathematics, University of North Bengal — New nonclassical self similar intermediate asymptotics considered recently [1,2] in the context of linear differential equations are shown to have interesting applications in offering a novel explanation of the origin of anomalous transport phenomena in turbulent flows in fluids and plasma devices. The intermediate asymptotics, in the late time or in the inviscid limit, conspire to produce smooth multifractal measures on a turbulent fluid medium leading naturally to generation of stretched Gaussian distributions for passive scalar tracer concentration from the turbulent, integral order, advection-diffusion equation. Such heavy tailed stretched Gaussian distributions can explain the observed anomalous scaling of the average and mean square displacements of tracer particles in a turbulent medium.We also point out that the present novel mechanism for generation of multifractal measure can actually be interpreted as a new class of instabilities leading to turbulence.

[1] D. P. Datta, On a novel signature of late time asymptotics: a new route to nonlinearity, (2013), Communicated.
[2] D. P. Datta, Novel Late Time Asymptotics: Applications to Anomalous Transport in Turbulent Flows, REDS,(2013), accepted.

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