

Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

A Generalized Brownian Motion Model for Turbulent Relative Particle Dispersion¹ BHIMSEN SHIVAMOGGI, University of Central Florida — A generalized Brownian motion model has been applied to the turbulent relative particle dispersion problem (Shivamoggi [1]). The fluctuating pressure forces acting on a fluid particle are taken to follow an Uhlenbeck-Ornstein process while it appears plausible to take their correlation time to have a power-law dependence on the flow Reynolds number R_e . This ansatz provides an insight into the result that the Richardson-Obukhov scaling holds only in the infinite- R_e limit and disappears otherwise. It provides a determination of the Richardson-Obukhov constant g as a function of R_e , with an asymptotic constant value in the infinite- R_e limit. This ansatz is further shown to be in quantitative agreement, in the small- R_e limit, with the Batchelor-Townsend ansatz for the rate of change of the mean square interparticle separation in 3D FDT. [1] B.K. Shivamoggi: arXiv: 1208.5786 (2014).

¹My thanks to The Netherlands Organization for Scientific Research for Support.

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Date submitted: 27 Jul 2015

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