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Magnetic field generation by non-Gaussian, non-random turbulent motion RAUL SANCHEZ, Universidad Carlos III de Madrid, DAVID E. NEWMAN, University of Alaska at Fairbanks — It is well known that a turbulent velocity field generates perturbations of the electric current and magnetic field that, under certain conditions, may generate an average,large-scale magnetic field. Such generation process is of great importance to account for the generation of large-scale magnetic fields in stars, planetary and laboratory plasmas. Traditionally, one attacks this generation process theoretically by assuming a random velocity field with near-Gaussian fluctuations. This simplifying ansatz allows to express the effective electromotive force appearing in Faraday's law in terms of a piece that is proportional to the large-scale magnetic field itself (the so-called α-term), and a second one that is proportional to its curl (the β term), if certain conditions regarding the symmetry of the system are met. Physically, the α-term represents a measure of the mean helicity of the turbulent flow. The β-term, an enhanced magnetic diffusivity. In this contribution, we depart form this traditional view and explore instead the consequences of considering Levy-distributed, Lagrangianly-correlated velocity fields, that have been currently identified as of relevance in regimes of near-marginal turbulence or in the presence of strong, stable sheared flows

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