Title: A certain prediction of production of uncertainty

Two nearly identical periodic turbulent velocity fields, initially differing by a very small error/uncertainty at the smallest scales and therefore near-perfectly correlated, gradually decorrelate as they evolve in time by incompressible Navier-Stokes dynamics. Initially this decorrelation is chaotic and characterised by a positive maximal Lyapunov exponent. Eventually it becomes stochastic and characterised by a power law growth of average uncertainty. Both uncertainty growth regimes are determined by turbulent compressive motions, via one-point strain rate statistics for the production of increasing uncertainty, and via two-point deformation rate statistics for the self-similar (scale-by-scale equilibrium) transfer (inverse cascade) of uncertainty from smaller to larger scales.

Bio: J.C. Vassilicos obtained his PhD from the University of Cambridge in 1991. From 1991 he was a Research Fellow in Wolfson College Cambridge and from 1994 to 2004 he was a Royal Society University Research Fellow initially in Cambridge and then at Imperial College London where he became Professor of Fluid Mechanics in 2003. In 2019 he moved to the Laboratory of Mechanics of Fluids of Lille (LMFL) as CNRS Director