

SEMINARIO
MECÁNICA MATEMÁTICA Y PROBLEMAS INVERSOS

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TITULO
Energy flux enhancement, intermittency and turbulence via Fourier triad phase dynamics in the 1-D Burgers equation.

Abstract: We present a theoretical and numerical study of Fourier space triad phase dynamics in 1-D stochastically forced Burgers equation at Reynolds number $Re \approx 27000$. We show that Fourier triad phases over the inertial range display a collective behaviour characterised by intermittent periods of synchronisation and alignment, reminiscent of Kuramoto model (1984) and directly related to shock collisions in physical space. These periods of synchronisation favour efficient energy fluxes across the inertial range towards small scales, resulting in strong bursts of dissipation and enhanced coherence of Fourier energy spectrum. The fast time scale of the onset of synchronisation relegates energy dynamics to a passive role: this is further examined using a reduced system where Fourier amplitudes are fixed in time -- a phase-only model. In it, we find intermittent triad phase dynamics without amplitude evolution and recover many features of the full Burgers system. Finally, for both full Burgers and phase-only systems the physical space velocity statistics reveal that triad phase alignment is directly related to the non-Gaussian statistics typically associated with structure-function intermittency in turbulent systems. This work was done in collaboration with Brendan P. Murray, and is published in *JFM* **850**, 624-645 (2018).

JUEVES 14 DE MARZO A LAS 16:00 HRS, SALA DE SEMINARIOS JOHN VON NEUMANN CMM, SÉPTIMO PISO, TORRE NORTE DE BEAUCHEF 851.