Geophysical Research Abstracts
Vol. 18, EGU2016-15090, 2016
EGU General Assembly 2016

Multifractal Analysis of turbulence in two-fluid simulations of Kelvin-Helmholtz instability

Claudia Rossi (1), Luca Sorriso-Valvo (2), Vincenzo Carbone (1), Francesca Di Mare (1), Fabio Lepreti (1), Francesco Califano (3), and Alessandro Retinò (4)

(1) Dipartimento di Fisica, Università della Calabria, I-87036 Rende (CS), Italy(rossi.claudia.17@gmail.com), (2) Nanotec-CNR, U.O.S. LICRYL di Cosenza, Ponte P. Bucci, Cubo 31C,I-87036 Rende, Italy, (3) Dip. Fisica, Università di Pisa; Largo Pontecorvo 3, 56127 Pisa,Italy, (4) LPP-CNRS/ Ecole Polytechnique/UPMC/Université Paris Sud,91128 Palaiseau Cedex, France

The statistical properties of the turbulence developing inside Kelvin-Helmholtz (KH) vortices have been analysed using a two-fluid numerical simulation. Structure functions (SF) of magnetic field fluctuations show a intermittent behaviour, with a curvature around ion scales at various order of the SF. Two ranges of scales have been identified (above and under ion inertial length) both showing non-linear scaling exponents. Scaling exponents have been tested using the extended self-similarity (ESS), showing good agreement. A p-model fit of the scaling exponents has been used to quantitatively estimate the intermittency. The analysis of PDFs and flatness confirm the presence of small intermittency. Since typically the dissipation is a multifractal field generated by an intermittent cascade, we have studied the topological properties of the dissipation proxies E.J and J2 through a box counting method to evaluate its mean fractal dimension and its multifractal spectrum. Results from multifractal and structure function analysis have been compared.