Geophysical Research Abstracts,
Vol. 11, EGU2009-1025-1, 2009
EGU General Assembly 2009

Kolmogorov entropy in the percolation regime: the saturation of chaos

R. Bitane (1,2), G. Zimbardo (2), A. V. Milovanov (3), and P. Pommois (2)

(1) Observatoire de la Côte d'Azur, Nice, France, (2) Università della Calabria, Rende, Italy, (3) Space Research Institute, Russian Academy of Sciences, Moscow, Russia

We report the first numerical computation of Kolmogorov entropy h of magnetic field lines extending from the quasilinear up to the percolation regime, using a numerical code where one can change both the turbulence level $\delta B/B_0$ and the turbulence anisotropy $l_{||}/l_{\perp}$. We find that the proposed percolation scaling of h is not reproduced, but rather a saturation of h is obtained. Also, we find that the Kolmogorov entropy depends solely on the Kubo number $R = (\delta B/B_0)(l_{||}/l_{\perp})$, and not separately on $\delta B/B_0$ and $l_{||}/l_{\perp}$. We apply the results to electron transport in solar coronal loops, which involves the use of the Rechester and Rosenbluth diffusion coefficient, and show that the study of transport in the percolation regime is required. A new theoretical interpretation for the saturation of the Kolmogov entropy is also proposed.