



Heating the solar wind by a MHD turbulent cascade

V. Carbone (1,2), R. Marino (1), L. Sorriso-Valvo (2,1), P. Veltri (1), A. Noullez (3), R. Bruno (4), B. Bavassano (4)

(1) Dipartimento di Fisica, Università della Calabria, Cosenza - Italy, (2) Liquid Crystal Laboratory, Cosenza - Italy, (3) Observatoire de la Cote d'Azur, Nice - France, (4) IFSI-INAF, Roma - Italy

Solar wind plasma is known to cool down more slowly while it is blown away from the sun than expected from an adiabatic spherical expansion. Some source of heating is thus needed to explain the observed temperature radial profile. The presence of a nonlinear turbulent MHD energy cascade has been recently observed in solar wind plasma (1). This provides for the first time a direct estimation of the turbulent energy transfer rate, which contributes to the in situ heating of the wind. The value of such contribution is shown to represent an important fraction (from 5% to 100%) of the heating, and is strongly correlated with the wind temperature.

(1) R. Marino et al., Phys. Rev. Lett. 99, 115001 (2007)