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On the fractal nature of the magnetic field energy density in the solar wind

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The solar wind offers a unique opportunity to investigate the properties of the magnetized driven turbulent plasma. Statistical studies of the solar wind plasma fluctuations yield reproducible and universal characteristics of the system on temporal scales of up to few hours. It has been suggested that the magnetic field energy density B^2, exhibit approximate self-similar statistics on many temporal scales and as such may be suitable for modelling purposes. We examine the scaling properties of B^2 in solar maximum and minimum using conditioned structure functions. Results show that the mono-scaling of the magnetic field energy density holds only during solar maximum, whereas at solar minimum it is multifractal which is consistent with a p-model for turbulence.