



An investigation of the distribution of the magnetic energy density and plasma kinetic energy density as a function of heliospheric distance

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The solar wind quasi-invariant (QI) is defined as the ratio of the magnetic energy density to the plasma kinetic energy density, i.e., the inverse square of the Alfvén Mach number (Osherovich, Fainberg and Stone, 1999). QI was found to be a very good proxy for solar activity with a high correlation coefficient (>0.9) when compared with sunspot number. This high correlation holds not only at 1 AU but also at the position of Venus at 0.65 AU (Fainberg, Osherovich and Stone, 2001). Finally, Voyager 2 observations in the range 1-20 AU confirm QI as a good measure of solar activity (Fainberg and Osherovich, 2001).

The Helios mission offers the unique possibility of examining QI as a function of radial distance closer to the Sun in the range 0.3- 1 AU for a large part of solar cycle 21. The work will present the systematics of QI variations in the inner heliosphere. The variation of He^{++} with solar cycle and distance from the Sun is taken into account as a factor when calculating QI. The results obtained will then be compared with previous work made in different solar cycles and at different heliocentric distances.