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# Magnetic flux density measured in fast and slow solar wind streams

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The magnitude of the radial component of the heliospheric magnetic field normalised to 1 AU, together with its sign, represents a measure of the magnetic flux density carried in the solar wind. This parameter, $B_R.R^2$ where R is the radial distance of the observations in AU, was found to be independent of heliolatitude by the Ulysses solar polar mission during its 1994-96 survey of heliolatiudes during solar minimum conditions. We examine the behaviour of this parameter during the entire mission of Ulysses, from 1990 to 2009, covering all phases of the solar cycle. We show that the parameter has a typical value, in absolute terms, generally of order 3 nT.(AU)$^2$, independent of heliolatitude in fast solar wind streams from the large coronal holes during solar minimum (although showing a significant decrease from the minimum in 1995-96 to 2007-08). However, it has a very different statistical distribution, peaking around zero, in the slow solar wind. In fact, this is also the case when ICMEs are filtered out from the observations, as these also represent high coronal temperature solar wind, similar to the more generally prevalent slow solar wind, but with a fundamentally different magnetic topology. The cause of the distribution of $B_R.R^2$ peaking around zero is therefore a fundamental property of the slow wind, just as the relatively constant (non-zero) value is a fundamental property of high speed flows from the cool coronal holes. This general observational conclusion is compatible with the possibility that the direction of the magnetic field at the origin of the slow solar wind is not radial, but broadly distributed.