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Radio observations of high-speed solar wind electron parameters near solar minimum: Ulysses 2007 fast latitude scan

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The first orbit of the Ulysses spacecraft gave us the opportunity to analyze for the first time several months of radio data in the stationary and steady state high-speed wind. The fast pole-to-pole transit in 1994-1995 has allowed us to make an accurate in situ diagnostics of the electron plasma parameters in the high-latitude heliosphere near solar minimum, using the thermal noise spectroscopy method on the URAP radio receiver. In particular, we have accurately obtained the radial profile of the electron density and temperature in the fast wind without data selection in contrast to ecliptic observations where different types of winds have to be sorted out. The electron thermal temperature profile behaves between adiabatic and isothermal, in qualitative agreement with a simple kinetic collisionless model. The third pole-to-pole fast latitude scan will occur in 2007-2008 again near solar minimum. The quasi-thermal noise spectroscopy will give unique measurements of the solar wind electron density and thermal temperature, other sensors being off. Preliminary observations of the third south pole passage in early 2007 will be presented and compared to the 3-D structure of the solar wind obtained during the previous solar cycle in 1994-95.