Recombination Line Observations with the Parkes Telescope at 75Mhz (1993 – 2003)

D. McConnell[1], W.C.Erickson[2]

[1]Australia Telescope National Facility, PO Box 76, Epping NSW 1710 Australia.
Email: David.McConnell@csiro.au

[2]School of Mathematics and Physics, University of Tasmania, Private Bag, Hobart, TAS 7001 Australia. Email: Bill.Erickson@utas.edu.au

Abstract

We describe a 10-year campaign conducted at 75 MHz with the Parkes Radiotelescope to detect the high quantum number recombination lines of carbon in absorption against the non-thermal Galactic radiation. After early success in 1993-4 and detection of the lines over an extended portion of the inner Galaxy, it has become increasingly difficult to achieve the required sensitivity. Typically, the observed line strengths T_L are $3x10^{-14} < T_L/T_{SYS} < 10^{-3}$, and observations are always made in the presence of interfering signals many times (10 – 100) T_{SYS}. We describe the equipment and methods used, present sample results and examples of terrestrial interference, and we discuss the possible sources of the sensitivity loss through the campaign. Experience gained in this program may be relevant to plans for LOFAR.