

A search for intervening HI absorption

Sarah N. Reeves^{1,2,3*}, Elaine M. Sadler^{1,3}, James R. Allison¹,
Baerbel S. Koribalski² and Stephen J. Curran^{1,3}

¹Sydney Institute for Astronomy, School of Physics A28,
University of Sydney, NSW 2006, Australia

²Australia Telescope National Facility, CSIRO Astronomy and Space Science,
PO Box 76, Epping, NSW 1710, Australia

³ARC Centre of Excellence for All-Sky Astrophysics (CAASTRO)

*email: s.reeves@physics.usyd.edu.au

Abstract. HI absorption-line studies provide a unique probe of the gas distribution and kinematics in galaxies well beyond the local universe ($z \gtrsim 0.3$). HI absorption-line surveys with next-generation radio telescopes will provide the first large-scale studies of HI in a redshift regime which is poorly understood. However, we currently lack the understanding to infer galaxy properties from absorption-line observations alone. To address this issue, we are conducting a search for intervening HI absorption in a sample of 20 nearby galaxies. Our aim is to investigate how the detection rate varies with distance from the galaxy. We target sight-lines to bright continuum sources, which intercept known gas-rich galaxies, selected from the HIPASS Bright Galaxy Catalogue (Koribalski *et al.* 2004). In our pilot sample, six galaxies with impact parameters < 20 kpc, we do not detect any absorption lines — although all are detected in 21cm emission. This indicates that an absorption non-detection cannot simply be interpreted as an absence of neutral gas — see Fig. 1. Our detection rate is low compared to previous surveys e.g. Gupta *et al.* (2010). This is, at least partially, due to the high resolution of the observations reducing the flux of the background source, which will also be an issue in future surveys, such as ASKAP-FLASH.

Keywords. galaxies: evolution — galaxies: ISM — radio lines: galaxies

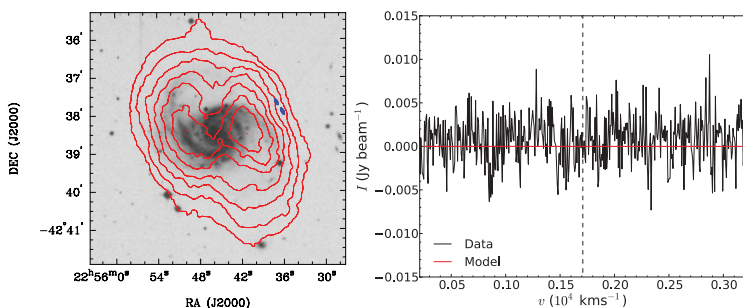


Figure 1: *Left:* NGC7412. Greyscale: Optical image of the galaxy. Large-scale contours: ATCA HI emission-line map of the intervening galaxy ($60''$ resolution). Small-scale contours: ATCA radio continuum image of the background source ($22:55:36.32 -42:37:46.50$, resolved into two components at $5''$). The HI disk clearly extends out as far as the continuum-source sight-line, despite the absorption-line non-detection. *Right:* The 21cm spectrum at the position of the background source (Reeves *et al.*, in prep). All spectra have been analysed with a Bayesian line-finder (Allison *et al.* 2012). The velocity of the galaxy is marked with a dotted line.

References

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