



A Neutral Hydrogen Survey of the NGC 7332 Region with the Arecibo L-band Feed Array

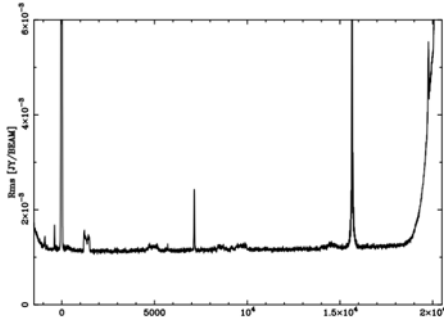


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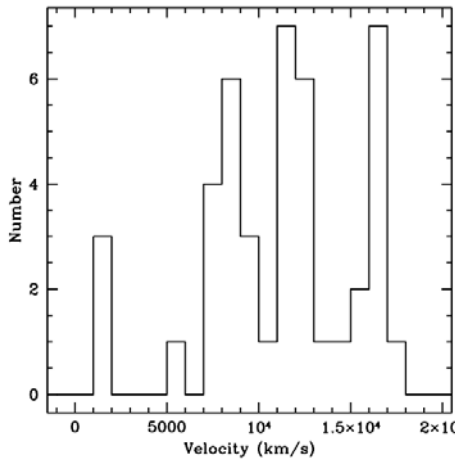
The Arecibo L-band Feed Array has been used to map a 5 square degree region out to a velocity of 18,000 km/s, covering a volume of $\sim 9,000 \text{ Mpc}^3$ (for $H_0=70 \text{ km s}^{-1} \text{ Mpc}^{-1}$). In this region we find 43 HI sources. 16 are previously catalogued, of which 6 have previous redshift measurements. The other 27 sources (63%) are new detections, we have identified optical counterparts for most of these sources from the DSS, but there remain four sources with only dubious counterparts and one with no obvious candidate. The HI sources have a median redshift of $\sim 12,000 \text{ km/s}$ ($\sim 170 \text{ Mpc}$) and range in neutral hydrogen content from 5×10^7 to $3 \times 10^{10} M_\odot$.



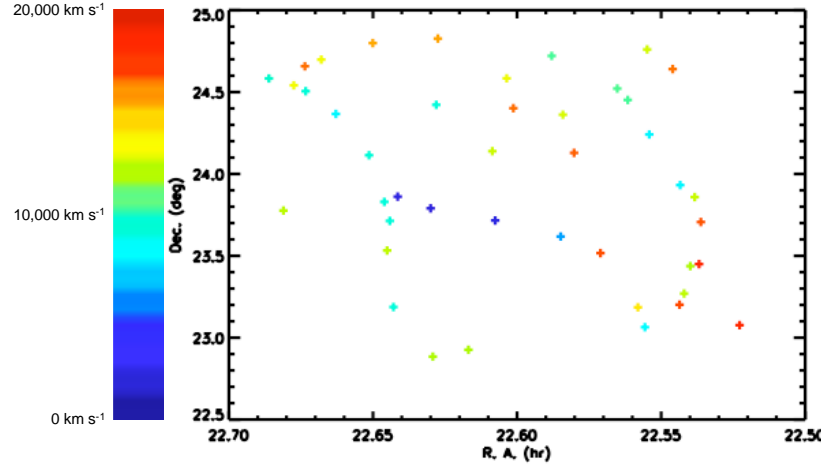
If I'm not here, then try at the Arecibo Observatory stand.
 rminchin@naic.edu



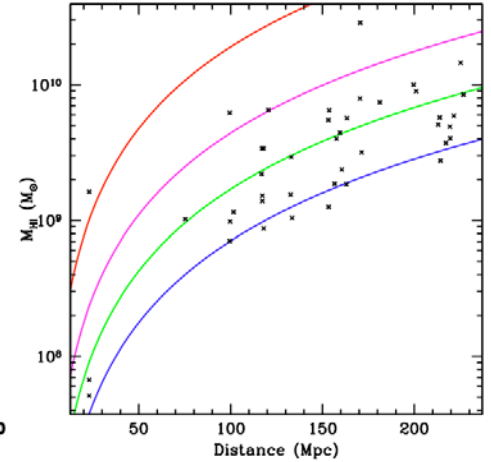
The noise distribution in the NGC 7332 field cube. Some of the 'noise' can be identified with galaxies entering the analysis, but the lines at $\sim 7,000 \text{ km s}^{-1}$ and $\sim 15,600 \text{ km s}^{-1}$ are due to interference.



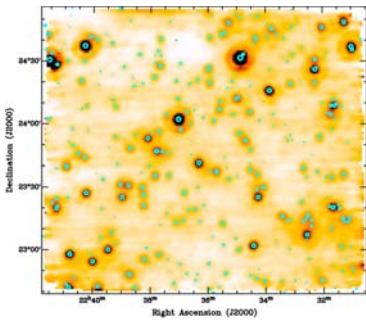
The distribution of galaxies in the NGC 7332 field cube. The median redshift is $11,744 \text{ km s}^{-1}$ and the mean is $11,145 \text{ km s}^{-1}$. 60% of the sources lie beyond $10,000 \text{ km s}^{-1}$, and over half of the sources below this velocity lie either in the NGC 7332 group or in an arc of galaxies at $\sim 8,900 \text{ km s}^{-1}$ (see figure to the right).



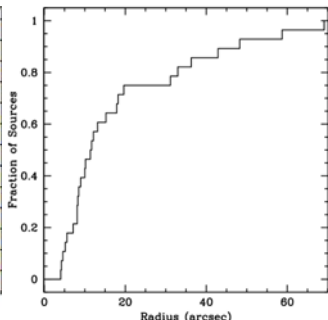
The figure above shows the spatial and velocity distribution of the 43 sources found by AGES in the NGC 7332 field. The three sources in the NGC 7332 group can be seen in dark blue. Other sources show possible signs of clustering, in particular the three highest redshift sources form a close triangle at R.A. $\sim 22.53^h$, Dec. $\sim 23.3^\circ$ ($16,619 - 17,019 \text{ km s}^{-1}$) and there is an arc of galaxies between $8,770$ and $9,046 \text{ km s}^{-1}$ stretching from R.A. $\sim 22.64^h$, Dec. $\sim 23.2^\circ$ to R.A. $\sim 22.69^h$, Dec. $\sim 24.6^\circ$.



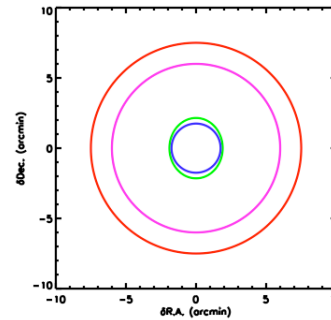
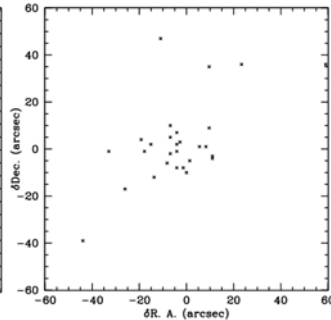
HI mass against distance for the AGES sources (assuming $H_0 = 70 \text{ km s}^{-1} \text{ Mpc}^{-1}$ and a distance of 23 Mpc for the NGC 7332 group; Tonry et al. 2001) with completeness limits for AGES (blue), ALFALFA (green; Giovanelli et al. 2005), HIDEEP (magenta; Minchin et al. 2003) and HIPASS/HIJASS (red; Meyer et al. 2004; Lang et al. 2003). Of the 43 sources detected by AGES, one would expect 15-20 sources to be seen in a survey with the depth of ALFALFA, 3-4 with HIDEEP and only 1 (NGC 7332) with HIPASS/HIJASS.



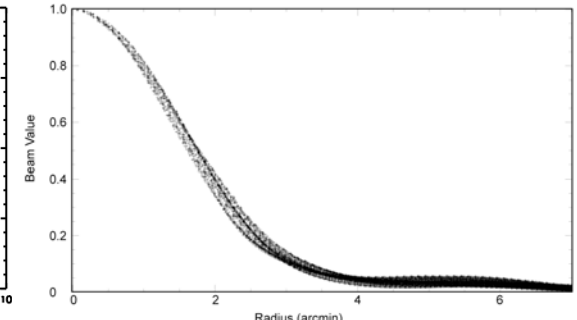
NGC 7332 field continuum sources overlaid with contours from the NVSS. The astrometry for AGES appears to be good across the whole field.



Analysis of the offset between radio and optical positions for sources with good optical counterparts. (Left) Cumulative distribution of offsets. The 1σ offset is 18 arcseconds and half of the sources fall within 11.5 arcseconds . (Right) Distribution of offsets in R. A. and Dec. There does not appear to be any significant pattern in the offsets; the average offsets are $-3 \pm 19 \text{ arcseconds}$ in R. A. and $3 \pm 18 \text{ arcseconds}$ in Dec.



Comparison of the AGES beam (blue; $3.5' \times 3.5'$) with the ALFALFA beam (green; $3.8' \times 4.3'$), HIJASS/VIRGOHI beam (magenta; $12' \times 12'$) and the HIPASS/HIDEEP beam (red; $15' \times 15'$)



The AGES beam measured off a high-resolution (0.1 arcmin/pixel) version of the continuum map. The beam was constructed from a number of strong continuum sources using the DAOPHOT routine PSF within IRAF. It can be seen that the half-power radius is $\sim 1.7'$ and that the first sidelobe falls at a radius of $\sim 5.2'$.