Outline

• What is AGES?
• Dark galaxy finding - potential
• Dark galaxy finding - reality
What is AGES?

• A deep HI survey of a variety of environments.
• Total of 200 square degrees in 13 regions.
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- A deep HI survey of a variety of environments.
- Total of 200 square degrees in 13 regions.
- Noise of 0.45 mJy over $\Delta V=10$ kms$^{-1}$, FWHM 3.8′.
What is AGES?

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What is AGES?

- A deep HI survey of a variety of environments.
- Total of 200 square degrees in 13 regions.
- Noise of 0.45 mJy over $\Delta V=10$ kms$^{-1}$, FWHM 3.8´.
- Can grid with FWHM down to 3.45´.
What is AGES?

- Linear
- Logarithmic
- Best-fit Gaussian
- Residual
- Beam Map
What is AGES?
Dark galaxy finding - potential

- Identification of candidates vital for finding Dark Galaxies.
- Median offset between AGES sources and optical counterparts is 18 arcsec.
Dark Galaxy

median value = 18 arcsec

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Dark galaxy finding - potential

- Identification of candidates vital for finding Dark Galaxies.
- Median offset between AGES sources and optical counterparts is 18 arcsec.
- At the median redshift of 12,000 kms$^{-1}$, corresponds to $\sim$15 kpc ($H_0 = 70$).
- Worst case (70$''$ at 18,000 kms$^{-1}$) $\sim$90 kpc.
Dark galaxy finding - potential

• Davies et al. (2006) predict ~23% of AGES sources to be dark galaxies.
• This is too high a proportion to lose to misidentification (c.f. 4% for ALFALFA).
• AGES can therefore set the best limits on the HI-rich dark galaxy population.
Dark galaxy finding - reality

- AGES has covered 4 regions or parts of regions so far, for a total of 20 sq. deg.
- Find around 10 sources/sq. deg.
- Therefore the prediction is for around 46 dark galaxies in the survey so far.
NGC 1156

- Auld 2007 (PhD thesis)
  - 3 sources without apparent optical counterparts on the DSS.
AGES J0302+2449
AGES J0302+2449

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NGC 1156

- Auld 2007 (PhD thesis)
  - 3 sources without apparent optical counterparts on the DSS.
  - 1 seen on deeper imaging,
  - 2 awaiting further follow-up.
AGES J0256+2546

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AGES J0300+2554

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Abell 1367

- Cortese et al. 2007 (in prep.)
  - See poster in the coffee room.
  - Diffuse hydrogen found in the CGCG 97027 and CGCG 97041 sub-groups in the Abell 1367 cluster.
CGCG 97027

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Abell 1367

• Cortese et al. 2007 (in prep.)
  – See poster in the coffee room.
  – Diffuse hydrogen found in the CGCG 97027 and CGCG 97041 sub-groups in the Abell 1367 cluster.
  – All of these are likely to be interaction debris.
  – Lost baryons, but not dark galaxies.
Virgo Cluster

• Taylor PhD field
  – See poster in the coffee room.
  – Probable HVCs found in foreground at ~250 kms$^{-1}$.
Foreground HVCs?
Virgo Cluster

- Taylor PhD field
  - See poster in the coffee room.
  - Probable HVCs found in foreground at ~250 kms\(^{-1}\).
  - 2 sources without apparent optical counterparts on the SDSS found behind the cluster.
AGES J1239+1152

AGES J1239+115214

V = 6911 km/s \ W20 = 126 km/s \ F = 0.186 Jy km/s
S/N peak = 8.14 \ S/N mean = 2.19

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AGES J1243+1148

AGES J1243+114811

\[ V = 12144 \text{ km/s} \quad \text{W20} = 105 \text{ km/s} \quad F = 0.130 \text{ Jy km/s} \]

S/N peak = 7.10  S/N mean = 2.20

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NGC 7332

- Minchin et al. 2007 (in prep.)
  - 1 source without an apparent optical counterpart on the DSS found.
AGES J2237+2253

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AGES J2237+2253

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Dark galaxy finding - reality

- 5 dark galaxy candidates found
- All have $M_{\text{HI}} > 10^8 \, M_\odot$.
- Could be LSB galaxies.
- Others may be misidentified with false optical counterparts.
- This is still a long way below theoretical predictions.
Conclusions

• AGES is the best current survey for uncovering a population of H\textsubscript{I}-rich dark galaxies.
• So far, number of candidates is \(~10\%\) of Davies (2006) prediction.
• The survey is ongoing and follow-up work is continuing.
• http://www.naic.edu/~ages