ATNF
Student Symposium 2002

First Session Chair: Erik Muller

9.15am	**Welcome**
9.20am	Daniel Mitchell RFI Mitigation: Adaptive Filters
9.40am	Catherine Drake Radio-Excess IRAS Galaxies
10.00am	Natasa Vranesevic Pulsar Birthrate
10.20am	Aaron Chippendale Imaging With Many Baseline Synthesis Interferometry
10.35am	Brad Warren The Nature of Nearby High HI Mass-to-Light Ratio Field Galaxies
10.50am	**Coffee**

Second Session Chair: Daniel Mitchell

11.10am	Emma Ryan-Weber What does HI gas in galaxies tell us about Lyman-alpha absorption systems?
11.30am	Erik Muller A statistical look at the morphology of HI in the Magellanic Bridge
11.50am	Meryl Waugh HI in the Fornax Region
12.10pm	Jess O'Brien UGC7321 - A Pure Disk Galaxy in the Process of Bulge Formation
12.30pm	**Lunch**

Abstracts

Daniel Mitchell

RFI Mitigation: Adaptive Filters

In radio astronomy real-time adaptive filters (and their post-correlation equivalents) can be used to model the RFI environment so that it can be cancelled from the astronomy signal path. I will describe a modified filter which utilises an additional reference signal to improve the RFI excision. The trade-off is that the injected noise of the new filter is stronger than the total residual of the standard filter. I will compare residual RFI and injected noise levels with that of the standard filter and the post-correlation approach. An example from the Australia Telescope Compact Array is also given.

Catherine Drake

Radio-Excess IRAS Galaxies

A sample of radio-emitting active galaxies has been identified by selecting objects from the IRAS Faint Source Catalog which lie above the FIR/radio correlation. These radio-excess galaxies have radio emission which is likely to be associated with an AGN, but many do not fit the traditional classification of radio-loud. ATCA observations show the majority of the radio sources to be compact and to have steep spectral indices. They are similar to Compact Steep Spectrum and GigaHertz Peaked Spectrum sources, though lower in radio power. The galaxies in our sample are highly luminous in the far infrared ($\log(L) > 11$ solar luminosities), comparable with Ultra-Luminous Infrared Galaxies. Optical imaging shows that many have disturbed morphology, suggesting that tidal interactions are responsible for the high FIR luminosities of these objects and may also be associated with fuelling the radio source. My PhD study involves radio and optical observations of the sample which will be used to determine the nature of these FIR-luminous radio-excess galaxies. Preliminary results from the observations and analysis will be presented and discussed.

Natasa Vranesevic

Pulsar Birthrate

How to find and explain the valid statistical methods aimed at deriving the initial spin periods and birthrate of pulsars?

Aaron Chippendale

Imaging With Many Baseline Synthesis Interferometry

Brad Warren

The Nature of Nearby High HI Mass-to-Light Ratio Field Galaxies

One of the first products of the HI Parkes All-Sky Survey (HIPASS), the first ever survey of extragalactic HI over the southern sky, is the HIPASS Bright Galaxy Catalogue (BGC) listing the 1000 apparently brightest HI sources. A comparison of the newly available HI data with the optical properties of the BGC galaxies revealed an interesting number (50) of high HI mass-to-light ratio ($M/L > 3$) intrinsically faint field galaxies. We are undertaking an extensive multi-wavelength follow-up (optical, infrared and radio) of a selected sample of these galaxies and comparing them to a similar sample of low HI mass-to-light ratio galaxies. We hope to identify the physical reasons why some dwarfs still consist mainly of primordial HI gas, whereas others have processed most of their gas into stars.

Emma Ryan-Weber

What does HI gas in galaxies tell us about Lyman-alpha absorption systems?

I will discuss the association of HI gas in galaxies with Lyman-alpha absorption systems. Firstly, through a measurement of column density distribution function at z=0 using 21-cm emission. This study used the ATCA to measure column density in galaxies selected from the HI Parkes All Sky Survey. We find that the likelyhood of intersecting a lyman-alpha absorption system with column density $19.1 \leq \log N\_HI \leq 20.3$ is a relatively flat function of galaxy HI mass and morphology. This implies that moderate to Damped Lyman-alpha absorption systems may be caused by a galaxies with a range of HI masses, morphologies and luminosities - not just large spiral galaxies as originally thought. In addition I will describe a proposed study to cross correlate HI detections in HIPASS with lyman-alpha absorption systems from the literature. Preliminary analysis suggests that the strength of absorption may be a stronger function of local galaxy density rather than the impact parameter to the nearest galaxy

Erik Muller

A statistical look at the morphology of HI in the Magellanic Bridge

Recent ATCA + Parkes observations of the HI line emission region comprising the western Magellanic Bridge show a complex filimentary, clumpy and chaotic nature. This Kinematic and spatial data indicate that SMC material dominates this part of the Bridge. We present results of analyses of the powerspectrum (PS) variation with velocity thickness, and results of the Specral Correlation Functin (SCF) tool. The SCF confirms a more persistant East-West spatial correlation of HI spectra in the Bridge, an effect of the tidal stretching forces imposed on the Bridge. The Bridge HI data show similar power spectra slopes to that of the SMC, although a different behaviour of Power law slope variation with velocity increments. These suggest the HI of the Bridge and SMC occupy a similar spatial scale range, but a different velocity dispersion range.

Meryl Waugh

HI in the Fornax Region

My current research project has involved a search of HIPASS data in a 620 sq. deg. region centred on the Fornax Cluster. In HI, the cluster is seen as only as a marginal overdensity of galaxies, unlike the distribution of optical galaxies. However, we have found that the cluster is part of the nearby large-scale structure, being embedded in a sheet of HI galaxies running through the region. We are interested in elucidating any differences between gas-rich galaxies in the cluster, looser groups and the field and in studying the processes and influences which may be responsible for these differences. Two deeper, blind, "basketweave" surveys of 100 sq. deg. each have also been undertaken using the Parkes telscope. The first survey field is centred on the cluster and the second field is about 10 deg north, a region without obvious clustering. These data are not fully analysed as yet but several low peak flux galaxies have been confirmed which were not detected in HIPASS.

Jess O'Brien

UGC7321 - A Pure Disk Galaxy in the Process of Bulge Formation