ATNF
Student Symposium 2001

First Session Chair: Erik Muller

9.30am	Melanie Johnston-Hollitt An Interpolated All Sky Rotation Measure Map
9.50am	Daniel Mitchell Interferometric Decorrelation of Low to Mid Earth Orbiting Satellite Signals
10.10am	Sebastian Gurovich Baryonic Tully Fisher Relation from HIPASS galaxies
10.30am	Tracy Getts OH/IR Stars and the Galactic Centre Distance
10.50am	**Coffee**

Second Session Chair: Daniel Mitchell

11.10am	Hayley Bignall Radio Intraday Variability and "Revolutionary Synthesis"
11.30am	Vivienne Wheaton Continuing Investigation of Radio Emission from SNR 1987A
11.50am	Erik Muller ^{12}CO emission from the Magellanic Bridge
12.10pm	Dion Lewis Pulsar glitches at Parkes and Mt. Pleasant
12.30pm	**Lunch**

Abstracts

Melanie Johnston-Hollitt

An Interpolated All Sky Rotation Measure Map

Passing polarised light through a magnetised plasma will result in rotation of the lights electric vector by an amount proportional to the strength of the field through which it passes. This effect, known as Faraday Rotation, is wavelength dependant. By obtaining measurements of the position angle of the electric vector at a number of different frequencies it is possible to obtain the Rotation Measure (RM), a quantity proportional to the integrated magnetic field strength along the line of sight.

We have produced an all sky rotation measure map by interpolating from a set of over 800 objects with published rotation measures. As we can assume that the rotation measure of extra-galactic objects are normally distributed the large-scale structure of the interpolated output should be due to the influence of our own galaxy. The map thus gives an estimate on the extent and strength of the magnetic field associated with the Milkyway and provides clues to the field structure associated with the spiral arms.

Daniel Mitchell

Interferometric Decorrelation of Low to Mid Earth Orbiting Satellite Signals

There is a large and growing number of Low Earth Orbiting (LEO) satellites. The constellations Iridium, Globalstar and ICO together contain about 124 LEOs, and the proposed Teledesic and Celestri systems will add another 900 or so to this. With relatively powerful downlinks, often with broad footprints, and transmitting between 1 and 30 GHz, LEO satellites are a serious threat to radio astronomy.

Fortunately, several characteristics of LEO communication links cause LEO signals to tend to decorrelate in an interferometer. In my presentation I will discuss the main decorrelating effects, including fringe rotation and delays smearing. I will also give simulated and observed examples for Globalstar satellite interference at the Australia Telescope Compact Array.

Sebastian Gurovich

Baryonic Tully Fisher Relation from HIPASS galaxies

The Tully-Fisher (TF) relation for galaxies is a relation between the stellar luminosity and rotation velocity, as measured by the HI profile width. Low surface brightness galaxies appear to deviate from the TF law. These gas rich galaxies have been observed to rotate faster than normal galaxies for their given luminous mass. However, when the gas is notionally converted to stars with a Mass to light ratio of 1, these galaxies re-establish themselves on the Baryonic Tully Fisher "BTF" Law. About 20 LSB galaxies have been observed to follow the "BTF"(McGaugh et al. 1999). The fact that they do is interesting given that the rotation velocity of galaxies is set primarily by their dark halo's. Does the BTF law indicate a coupling between the dark halo dynamics and the luminosity of the stellar baryons? Was this coupling set during the time of galaxy formation or by feedback processes within galaxies. For my Phd project I intend to observe a sample of about 200 gas-rich galaxies selected from the HI Parkes All Sky Survey (HIPASS) with the goal to project I intend to observe a sample of about 200 gas-rich galaxies selected from the HI Parkes All Sky Survey (HIPASS) with the goal to establish the generality of the "Baryonic Tully Fisher"relation, measure its intrinsic slope and estimate how tight it is.

References

McGaugh, S.S., Schombert, J. M., Bothun G. D., de Blok, W. J. G., ApJ 533 99.

Tracy Getts

OH/IR Stars and the Galactic Centre Distance

OH/IR stars provide a unique means of determining accurate, geometric stellar distances. This is achieved by combining their angular and linear diameters. Using this technique, my PhD project aims to determine the distance to the Galactic Centre with better than 5 percent accuracy (recent estimates are accurate to approximately 20 percent). As I have only recently begun this project, this talk will be a background to these stars and an outline of the technique that will be used to determine their distances and the distance to the Galactic Centre.

Hayley Bignall

Radio Intraday Variability and "Revolutionary Synthesis"

Accumulated evidence strongly favours interstellar scintillation (ISS) as the principal mechanism for intraday variability (IDV) observed in AGN at cm wavelengths. I will discuss a new direction my project has taken, in the light of some recent discoveries, which aims to use ISS to obtain information on the ISM of our own galaxy, and on the microarcsecond-scale structure of the scintillating sources.

Vivienne Wheaton

Continuing Investigation of Radio Emission from SNR 1987A

The latest observational results of the ATCA monitoring of SNR 1987A will be presented. Putative trends observed in the radio emission will be discussed, and compared with trends observed at other radio frequencies, by the MOST, and with results from the

HST and Chandra. Some possible explanations of the observed behaviour of SNR 1987A will be outlined for discussion.

Erik Muller

^{12}CO Emission from the Magellanic Bridge

The 22m Mopra Telescope has been used to search for the ^{12}CoJ=(1-0) frequency within the Magellanic Bridge, with positive results. This detection indicates that star formation is an ongoing process within the Bridge, and will lead to a determination of the H_2 content of the local region. This detection is, to our knowledge, the first measurement of ^{12}CO within the Magellanic Bridge.

Dion Lewis

Pulsar glitches at Parkes and Mt. Pleasant

Pulsar glitches at Parkes and Mt. Pleasant An introduction to the young pulsar timing project on Parkes and the daily pulsar timing observations at Hobart. Results will include the most recent glitches found at Parkes and the January 2000 glitch in Vela and the implications given by a null observation by Chandra on neutron star interiors.