

Name: Prof Michael Burton

Affiliation: UNSW

Talk details: The Mopra Southern Galactic Plane CO Survey

The talk will discuss the progress and plans for the molecular gas survey of the 4th quadrant of our Galaxy currently being undertaken with the Mopra radio telescope. This survey will provide a key input behind the science that CTA will yield, the location of many of the nuclei that high energy cosmic rays collide with to produce the gamma rays that CTA will measure. The Mopra survey produces this picture at an angular scale compatible with the new view of the gamma-ray sky that CTA will produce.

Name: Dr Roland Crocker

Affiliation: ANU

Talk details: Giant Outflows from the Centre of the Milky Way

Analysis of Fermi data recently revealed giant gamma-ray outflows emerging from the nucleus of the Milky Way (the 'Fermi Bubbles'); follow-up observations with Parkes have revealed the corresponding giant, magnetized Radio Lobes. There is ongoing controversy around the source of these structures: are they inflated by recent activity of the Galaxy's central, super-massive black hole or, alternatively, nuclear star formation over much longer periods of time? Relatedly, it is also in dispute whether the observed gamma-rays are dominantly leptonic or hadronic in origin. I will discuss these issues from a theoretical perspective and consider what more we might expect to learn about the Fermi Bubbles from CTA.

Name: Prof Miroslav Filipovic

Affiliation: University of Western Sydney

Talk details: CTA and Magellanic Clouds

Name: Dr Eric Howell
Affiliation: University of Western Australia

Talk details: Gamma-ray bursts in the multimessenger era

Multiwavelength observations have shown gamma ray bursts (GRBs) to be amongst the most luminous and distant transient events in the Universe. They have originally been categorised into two populations through their duration and spectral hardness: long/soft and short/hard. However, subsequent observations in some bursts, such as low-luminosity GRBs, high energy extended emissions, ultra-long durations and host galaxies, have broken this simple framework. The opening of the gravitational wave window within the next few years, along with co-ordinated multimessenger observations, could provide important breakthroughs in our understanding of GRBs and resolve some of the present issues. This talk will discuss efforts to untangle the global and intrinsic properties of GRBs. It will describe how Australia is geared to contribute to the multimessenger era; in particular how the Cherenkov Telescope Array (CTA) can play an important role.

Name: Prof Anne Green
Affiliation: University of Sydney

Talk details: Title: Supernova Remnant Searches with the reborn Molonglo Radio Telescope

The Molonglo Radio Telescope, a large cylindrical paraboloid interferometer located near Canberra in Australia, has been a very effective machine for discovering supernova remnants because of its excellent capability to image weak diffuse radio sources. The telescope has been redeveloped with a digital receiver system and optic fibre transmission network leading to a hybrid signal backend to process data at rates up to 22 Gbytes/sec in real-time. The new configuration is 10 times more efficient than the previous system with substantially increased sensitivity and bandwidth (centred on 843 MHz) and a field of view of about 8 square degrees. The mechanical infrastructure has been retained; hence the angular resolution remains at 43 arcsec. The RMS sensitivity limit is expected to be about 0.1 mJy/beam, which should reveal many more supernova remnants. Correlating any new detections with gamma-ray sources will add to understanding of cosmic ray acceleration sites and mechanisms. The talk will present some results from the new system and some recent detections with the existing telescope.

Name: Dr Yvonne Wong
Affiliation: UNSW

Talk details: Neutrinos and cosmology

Name: Dr Martin White
Affiliation: University of Adelaide

Talk details: I will summarise recent and proposed dark matter studies of the University of Adelaide CoEPP group. This includes the development of new statistical code for applying astrophysical and collider constraints to generic dark matter models, detailed studies of effective theories of dark matter and Higgs portal models, and Large Hadron Collider measurements relevant to the dark matter problem. Some recent results include studies of the CTA prospects for dark matter discovery and/or exclusion.

Name: Miss Rebecca Blackwell
Affiliation: University of Adelaide

Talk details: The Galactic Centre in High Resolution

The Mopra Radio Telescope survey of the Central Molecular Zone in Carbon Monoxide (four isotopologue lines simultaneously) is nearing completion. This dataset, with a spatial resolution of 35" and spectral resolution of 0.1km/s, show unprecedented detail in our Galactic Nucleus. Comparison with the H.E.S.S. Galactic Ridge of diffuse VHE TeV gamma-rays may begin to discriminate between the hadronic and leptonic production scenarios. However, it will be CTA, with a resolution similar to that of the low-density CO gas, which will ultimately reveal whether the Galactic Ridge of gamma-rays is more strongly associated with the molecular matter, or the magnetic field of the Galactic Centre.

Name: Dr Catherine Braiding
Affiliation: UNSW

Talk details: #TeamMopra - Let's do a science!

In this short presentation Catherine will discuss the latest plans for getting the public to join in and help fund science through a kickstarter campaign to save the Mopra telescope. After going over the proposed timeline and required inputs from the science team, she'll open the floor to discussion and pick everyone's brains for additional ideas and suggestions.

Name: Prof Michael Ashley
Affiliation: University of New South Wales

Talk details: A THz telescope at Ridge A, Antarctica

2015 marks the fourth year of operation of HEAT - a 0.62m aperture THz telescope - at Ridge A on the Antarctic high plateau. HEAT is conducting a survey of the Galactic Plane in the atomic carbon lines at 492 and 809 GHz, [NII] at 1461 GHz, and CO lines that fall within the 2 GHz bandpass at these frequencies. The spatial resolution is 2.5 arcminutes at 809 GHz; the spectral resolution is 2 km/s. The data from the survey are publically available.

We are now planning a more ambitious follow-up mission using a detector cooled to 4K (as opposed to the current 50K), with the potential for interferometry.

Not only is the science relevant to CTA, there are some helpful technology lessons relating to remote power systems, reliable computing systems, and remote operation.

Name: A/Prof Melanie Johnston-Hollitt
Affiliation: Victoria University of Wellington

Talk details: Early Results from the Murchison Widefield Array GLEAM Survey and Prospects for Complementary Science with CTA

The Murchison Widefield Array (MWA) is a low frequency (80 - 300 MHz) radio telescope operating in Western Australia as a precursor to the vast low frequency component of the Square Kilometre Array (SKA). Recently the MWA Collaboration have initiated a survey of the sky south of +30 degrees in 5 frequency bands to the current confusion limit of the array. This survey, GLEAM, has produced some spectacular images of the Galactic Plane uncovering many new supernova remnants and accurately mapping all of the HII regions in the Galaxy, pinpointing many areas of massive starformation. Additionally, GLEAM, provides excellent imaging of non-thermal diffuse emission in galaxy clusters showing such emission extends well beyond all previous imaging leading to possible complementary work with CTA. In this presentation I will describe the GLEAM survey and early results, focusing on areas of complementarity to CTA.

Name: Prof. Joss Bland-Hawthorn
Affiliation: (Australian Laureate Fellow , University of Sydney)

Talk Details: Front-row seat on the daily life of a supermassive black hole

Abstract: The Galaxy's supermassive black hole (Sgr A*) is a hundred times closer than any other massive singularity. It is surrounded by a highly unstable gas disk so why is the black hole so peaceful at the present time? This mystery has led to a flurry of models in order to explain why Sgr A* is radiating far below (1 part in 10^8) the Eddington accretion limit. But has this always been so? Evidence is gathering that Sgr A* has been far more active in the recent past, on timescales of thousands of years and longer. The bipolar wind discovered by MSX, the gamma-ray bubbles discovered by Fermi-LAT, the WMAP haze, the positronium flash confirmed by INTEGRAL, are suggestive of something truly spectacular in the recent past. We present exciting new evidence that the Galactic Centre was a full blown "active galaxy" just two million years ago. The echo of this incredible event can be seen today imprinted across the Galaxy.

Name: A/Prof Gavin Rowell
Affiliation: University of Adelaide

Talk details: HESS Galactic Plane Survey and implications for CTA

The HESS TeV gamma-ray telescopes have revealed over 60 TeV gamma-ray sources in the Milky Way. I'll discuss the latest results from this ongoing survey and highlight some of the major open questions which will significantly influence many of the observational programmes carried out by CTA. Linkages to other areas of astronomy will also be discussed.

Name: A/Prof Gavin Rowell
Affiliation: University of Adelaide

Talk details: CTA Status, Science & Australia's role

The Cherenkov Telescope Array (CTA) is a major world-wide astronomy project with over 1000 scientists now participating. CTA will be 10 times more sensitive than current ground-based TeV gamma-ray telescopes and provide a transformational step in the development of this field. I will summarise the current status of CTA's development, and outline Australia's role in this exciting project. Some of the key science goals will also be discussed to set the scene for this workshop.

Name: Dr Gary Hill
Affiliation: University of Adelaide

Talk details: Neutrino Astronomy with IceCube

IceCube has detected a flux of high energy neutrinos from sources unknown, but likely a mix of galactic and extra-galactic. In this talk I will review the properties of the observed neutrinos, and discuss work aimed at understanding their origin.

Name: Prof. Geoff Bicknell
Affiliation: ANU

Talk details: Very High Energy Emission from Jets

Name: Yasuo Fukui
Affiliation: Nagoya University

Talk details: Accurate measurement of interstellar hydrogen as the target of hadronic gamma rays

I present a new method of measuring the interstellar hydrogen based on the Planck dust properties at sub-mm wavelengths. The high accuracy of the dust optical depth allows us to calculate the optical-depth-corrected hydrogen column density with error bars less than 10%, an order of magnitude better than the previous method which assumes optically thin HI 21 cm spectrum. I present applications of the method to the local interstellar medium as well as to the TeV gamma-ray SNR RX J0852.0-4622 (Vela Jr.). The method successfully explains the "dark gas" and the target protons in the SNR by optical-depth-corrected HI. I discuss that the method is applicable in general to the CO emitting regions, allowing us to have an accurate view of the total interstellar hydrogen in the Galactic plane including the Galactic centre.