CTA status and Key Science Project opportunities for Australia – G. Rowell (Adelaide)

I will present an overview of CTA and its current construction status. Much of CTA's science goals will be achieved through its Key Science Projects (KSPs) and I will also outline areas where CTA-Australia can play important roles.

Update on Australia's involvement in the CTA Observatory – J. Murray (AAL)

Evolutionary Map of the Universe: complementarity to CTA – R. Norris (WSU/CSIRO)

ASKAP is now ramping up towards full operation, and EMU (Evolutionary Map of the Universe), is now generating science results from "EMU early science", including the 2000 sq deg "EMU cosmology field". I will discuss the latest results, the ASKAP performance, and plans for the full EMU survey,. and show how it will facilitate CTA science.

Update on the Mopra Central Molecular Zone Carbon Monoxide Survey – R. Blackwell (Adelaide)

I will present an update on the status of the Mopra CMZ CO dataset, including a focus on analysis towards the HESS source J1741-302. Preliminary work towards correcting for the optical thickness of the 12CO using the 13CO isotopologue line will also be presented.

Gravitational wave astronomy and the CTA. - P. Lasky (Monash)

Multimessenger gravitational-wave astronomy is now a reality. I will discuss the LIGO observations of binary black hole and binary neutron star mergers, and some of the physics behind the production of high-energy photons in these events.

Synergy SKA - CTA: Supernova remnants as cosmic accelerators - F. Cavallaro (INAF-OACt)

Supernova remnants (SNRs) are one of the most important sites where particles are accelerated with high efficiency and in a wide range of energies, becoming an important component of cosmic rays. A good test for this hypothesis will be possible using the data collected by next-generation radio and gamma-ray observatories, like the Square Kilometre Array (SKA) and the Cherenkov Telescope Array (CTA). Radio emission is fundamental to explore the SNR environment and to shed light on the physical processes involved in particle acceleration, providing direct links to high-energy physics. Two cases of SNRs recently studied in radio are presented, showing the importance of high-resolution radio images. An overview of SKA and its precursors, and in particular ASKAP, is given with our ongoing preparation work. In particular, we present the EMU survey (planned with ASKAP in late 2018) and the pathfinder project SCORPIO, which is based on ATCA, ASKAP and Parkes observations. Finally a direct view of the tight connection between SKA and CTA future studies of SNRs is provided.

ASKAP Observations of the SCORPIO field - G. Wong (WSU)

We present new observations carried out with the Australian Square Kilometre Pathfinder Array (ASKAP) towards the Stellar Continuum Originating from Radio Physics In Ourgalaxy (SCORPIO) field, an area covering ~340 < l < ~348 and ~-3.2 < a < ~4.5, as a part of the early science for the Evolutionary Map of the Universe (EMU) survey. This presentation will discuss previous work towards the region, configurations of the ASKAP observations, and preliminary comparisons to the Mopra Southern Galactic Plane CO survey. In addition, we will present new ASKAP observations towards the Small Magellanic Cloud.

The Murchison Widefield Array - GLEAM results – I. Bojicic (WSU)

The Murchison Widefield Array (MWA) radio telescope is the low-frequency patfinder for the Square Kilometre Array located at the Murchison Radio-astronomy Observatory (MRO) in Western Australia. We are utilizing results from the GaLactic and Extragalactic All-sky MWA (GLEAM) survey in order to examine radio continuum spectral properties of a sample of Galactic Planetary Nebulae (PNe) and Galactic Supernova Remnants (SNRs). In this talk I will present GLEAM survey from the end-user's perspective and preliminary results of our attempt to establish a robust method for deriving angular diameters of PNe from radio continuum measurements.

UTMOST FRB search and trigger program. - C. Flynn (Swinburne)

Young supernova remnants (ISM and gamma-rays) – N. Maxted (UNSW)

Gamma-ray astronomy may offer answers to a long-standing question of high energy astrophysics: Where do cosmic rays come from? The gamma-ray emission seen from some middle-aged supernova remnants is now known to be from distant populations of cosmic-rays (probably accelerated locally) interacting with gas, but there is still much work to be done in accounting for the Galactic cosmic-ray flux. Dense gas tracers such as CS and NH3 have proven to be useful probes of gamma-bright regions, while SiO emission can directly highlight shock-disrupted gas in middle-aged W28 supernova remnant, helping to reveal it as a TeV cosmic ray accelerator. Young PeV gamma-ray supernova remnants require different techniques to address the question of cosmic-ray acceleration. The CTA telescope will allow us to do this. I will present multi-wavelength studies of the young supernova remnants RX J1713.7-3946, HESSJ1731-347, Vela Jr, HESS J1534-571 and others. I will describe how Mopra CO data will put future gamma-ray maps into context.

The interstellar medium surrounding massive star cluster Westerlund 1 and the VHE gamma-ray source HESS J1646-458 – C. Snoswell (Adelaide)

The gamma-ray source, HESS J1646-458, is an extended emission, over 2 degrees in diameter, making it one of the largest of its kind in the Milky Way. Due to its large size, the source overlaps a few possible sites of high energy particle acceleration. Most notably of these is the stellar cluster Westerlund-1, which represent one of the most massive stellar cluster in the galaxy.

The current most likely cause for the gamma-ray emission HESS J1646-458 is through cosmic-rays (CR) being accelerated out of Westerlund 1, efficiently gain energy through interactions with the shockfront caused by a 'Collective Cluster Wind' and then further interact with the surrounding interstellar medium (i.e. molecular and atomic gas). This interaction between high energy CRs and the interstellar medium produces the high energy gamma-rays. If this is indeed the relationship between HESS J1646-458 and Westerlund 1 than a dedicated study of the surrounding molecular and atomic environment is necessary for further calculations on the density of high energy CRs as well as to examine the possibility of propagating particles though a low-density or high-density medium.

3D view of cosmic ray production sites: supernova remnants interaction with molecular clouds – J. Lazendic-Galloway (Monash)

Powerful shock fronts of supernova remnants (SNRs) are very likely the powerhouses where particles can be accelerated to become cosmic rays with energies up to a knee. However, environment surrounding SNRs are also import, as we observe many older SNRs being very bright in gamma-rays, although their shocks have slowed down and should not be efficient in accelerating particles anymore. Thus, interactions between SNRs and molecular clouds (MCs) are an important condition when we consider the mechanisms for cosmic ray production. However, looking for kinematic evidence of supernova remnant interaction with the ambient molecular clouds is not easy. The 1720 MHz OH maser line has been found in about 10% of the SNRs and can be used a signpost of the interaction, otherwise a spatial correlation between SNRs and MCs is used to assess the physical interaction. However, if 2D morphological distribution is the only evidence for interaction, this is not definitive confirmation of shock interaction. We used a visualisation software to create 3D maps of molecular clouds interacting with SNRs, which provide more detailed view of such interaction. I will present a study of a large-scale molecular cloud distribution around the Tornado nebula to examine the degree of influence on Tornado's radio and gamma-ray morphology by its environment.

Cherenkov Telescope Ring – D. Elsaesser (Dortmund)

Cosmic rays and particle physics studies with CTA – J. Bellido (Adelaide)

CTA to probe new Physics. - C. Boehm (Uni. Sydney)

Optical telescope facilities in Australia - A. Hopkins (AAO)

There is a rapid evolution in the way that Australian optical telescope facilities are being used, as a consequence of Australia entering into the ESO Strategic Partnership, and with new facilities being commissioned. This

includes a change in the operational model for the Anglo-Australian Telescope, broader access to facilities on Siding Spring by the Australian community, and new facilities such as TAIPAN on the UK Schmidt Telescope, and the Huntsman Array Telescope. I will give updates on these developments and explore opportunities for the CTA community to maximise scientific engagement with and use of these observational resources.

Update on High-Energy Phenomenology of the Inner Galaxy - R. Crocker (ANU)

The old stellar population of the Galactic Bulge exhibits surprisingly strong activity at high energies. In particular, this old population is responsible for almost half the positrons detected in annihilation radiation from the Galaxy and for the intriguing "Galactic Centre Excess" signal detected in Fermi data and claimed previously as a dark matter signature. I will give an update on these phenomena and explain how we are tentatively coming to understand them as energised by interactions (accretions, mergers) occurring within white dwarf binary systems.

The Southern Galactic Plane in CO. - C. Braiding (UNSW)

Now that the third data release of the Mopra CO survey has been published, we'll take you on a whirlwind tour of the latest paper, complete with improved maps, PV diagrams and a catalogue of interesting blobs that illustrate the structure of our Milky Way between the longitudes of l = 300-350 degrees.
Looking beyond to our next paper, I will present the first results from our next major data release, which will cover the full longitudinal range of the survey from l = 255-11 degrees (though limited in latitude to -0.5<=b<=+0.5 degrees). We shall probably also discuss observing plans for 2018, to ensure full coverage at latitudes -1.0<=b<=+1.0 degrees.

Interstellar gas associated with the Galactic and Magellanic supernova remnants - H. Sano (Nagoya)

Interstellar gas associated with supernova remnants plays an important role in understanding the origins of cosmic rays and high-energy radiation. In this talk, we will present latest results from our ongoing works in the Galactic and Magellanic supernova remnants and mention a future works.

CTA-SST: CHEC Status and Lab Measurements - S. Einecke (Adelaide)

The Compact High-Energy Camera (CHEC) has been developed for the Small-Sized Telescopes (SSTs) of CTA. In this talk, the SST project will be introduced, and the current status of CHEC and related lab measurements will be presented.

Gamma-ray Analysis and Prospects for Machine Learning Applications – S. Einecke (Adelaide)

Gamma-ray astronomy offers a wide range of opportunities to apply machine learning techniques. In this talk, multiple prospects to improve different steps in the analysis chain of Imaging Air Cherenkov Telescopes will be presented, and an overview of the CTA software and analysis package will be given.