

Science with AO-fed instruments on large telescopes

Venue: Dunk Island, Great Barrier Reef, Australia
Date: April 6-11, 2008
Host: Anglo-Australian Observatory
SOC: Bland-Hawthorn, Allington-Smith, Cecil, Colless, Cuby, Morris
LOC: Bland-Hawthorn, Ellis, Horton, Sealey, Woods
WWW: www.aao.gov.au/conf/DunkIsland



Topic: This 4-day workshop looks at the science drivers for AO-fed, optical through mid-infrared imaging spectrographs on large ground-based telescopes. It will encompass instrumentation for both the current generation of 8m-class telescopes and future Extremely Large Telescopes. It is very timely, as AO systems are now starting to deliver on the substantial investment made in them worldwide. The workshop will consider the impact of entirely new technologies and old concepts revisited.

Many of the invited talks will be given by astronomers who work at the interface of cutting-edge science and innovative instrumentation; others have been chosen for their “big picture” approach to scientific questions. The relevant technologies will include IFUs, image slicers, MEMs, tunable filters, 3D detectors, smart focal planes, etc. The workshop will introduce a number of technologies for the first time and discuss their far-reaching scientific potential: such technologies include photonic OH suppression and integrated photonic spectrographs at near and mid-IR wavelengths.

The ultimate goal of the workshop is to cross-fertilise the imaginations of astronomers and instrumentalists in order to inspire the next generation of innovative astronomical instruments. The workshop format will be relaxed, with a generous afternoon break, to allow delegates and their families to enjoy the magnificent coral reef environment of Dunk Island.

Some of the questions that we would like to address are:

- ❖ What are the science drivers for (near) diffraction-limited imaging spectroscopy?
- ❖ What are the main science drivers for ultra-deep exposures (>1 Msec)?
- ❖ What are the primary sources of systematics (e.g. rotating spider) in such exposures?
- ❖ Is there a compelling case for mid-IR imaging spectroscopy from the ground?
- ❖ Several AO variants are now under development: what science motivates these different approaches (e.g. MOAO) and do we have properly optimized instruments to match?
- ❖ Have we reached the limit of dynamic range and minimizing light scatter (e.g. extremely bright laser guide stars)?
- ❖ Is there a strong case for contiguous integral-field formats bigger than 300×300 (e.g. VLT MUSE) or for formats that are highly configurable (e.g. Honeycomb)?
- ❖ What are the limitations for AO-fed instruments (other than AO) and how might these be overcome a decade from now?
- ❖ What opportunities are there for new approaches to reduce the cost of ELT instruments?
- ❖ What are the expected science gains from ELTs compared to JWST?
- ❖ What are the synergies between ELTs and JWST/ALMA/SKA/ConX-XEUS?

Monday

SESSION 1: AO Science and Technology – State of the Art

Chair: Max

09:00 Talk	[25+5]	Matthew Colless – AO and observational cosmology
09:30 Talk	[25+5]	Brian Schmidt – Exploring the Universe with SNe
10:00 Talk	[25+5]	Reinhard Genzel – Future science with AO
10:30 Morning break	[30]	
11:00 Talk	[25+5]	Masami Ouchi – Wide-field surveys for $z \sim 7$ sources
11:30 Talk	[25+5]	Ric Davies – AGN with adaptive optics
12:00 Talk	[25+5]	Marcella Carollo – Deconstructing galaxies
12:30 Talk	[25+5]	Ryo Kandori – Subaru exo-planets survey

13:00 Lunch

Chair: Sheckman

15:00 Talk	[25+5]	Matt Lehnert – Constraints on AO-fed ELT spectrographs
15:30 Talk	[25+5]	Knut Olsen – Resolved stellar populations with AO+ELTs
16:00 Talk	[25+5]	Isobel Hook – Science goals and priorities for ELTs
16:30 Afternoon break	[30]	
17:00 Talk	[25+5]	Joe Jensen – Gemini AO
17:30 Talk	[25+5]	Hideki Takami – Subaru AO
18:00 Discussion	[30]	

19:30 Dinner

Tuesday

SESSION 2: New Ideas in AO and Prospects for ELTs

Chair: Genzel

09:00 Talk	[20+5]	Jean-Gabriel Cuby – Wide field AO on ELTs
09:25 Talk	[20+5]	Guy Monnet – AO requirements for European ELT
09:50 Talk	[20+5]	Claire Max – MOAO and AO at optical wavelengths
10:15 Talk	[20+5]	Roberto Ragazzoni – Very wide field MCAO/GLAO
10:40 Morning break	[30]	
11:10 Talk	[20+5]	Francois Rigaut – Gemini MCAO
11:35 Talk	[20+5]	Norbert Hubin – ESO AO roadmap towards an ELT
12:00 Talk	[20+5]	John Storey – Wide-field AO from Antarctica
12:25 Talk	[20+5]	Richard Myers – LGS MOAO pathfinder for the E-ELT

13:00 Lunch

SESSION 3: AO Instrumentation - State of the Art (8-10m)

Chair: Hook

15:00 Talk	[25+5]	Roberto Abraham – Flamingos-2 Tandem Tunable Filter
15:30 Talk	[25+5]	Michel Marcelin – New Technology Tunable Filter
16:00 Talk	[25+5]	Roland Bacon – 2nd Generation VLT instrument MUSE
16:30 Afternoon break	[30]	
17:00 Talk	[25+5]	Gerald Cecil – Competitive AO on small telescopes
17:30 Talk	[25+5]	Michael Lloyd-Hart – Multi-laser AO: first on-sky results
18:00 Discussion	[30]	

19:30 Dinner

Wednesday

Free day - trip to Outer Reef (and we won't leave anyone behind!)

Thursday

SESSION 4: Concepts and Ideas for ELT instrumentation

Chair: Lilly

09:00 Talk	[25+5]	Jeremy Allington-Smith – Image slicers on ELTs
09:30 Talk	[25+5]	Anna Moore – IRIS: first light imaging spec. with TMT
10:00 Talk	[25+5]	Fraser Clarke – First light instrument for the E-ELT?
10:30 Morning break	[30]	
11:00 Talk	[25+5]	Steve Sheckman – GMT instrument suite
11:30 Talk	[25+5]	Colin Cunningham – An integrated multiwave. suite?
12:00 Talk	[25+5]	Elizabeth Barton – Searches for highest redshift sources
12:30 Talk	[25+5]	Masanori Iye – Discovery of $z=6.96$ source and future plan

13:00 Lunch

Chair: Barton

15:00 Talk	[25+5]	Peter McGregor – AO-corrected integral field for GMT
15:30 Talk	[25+5]	Simon Morris – The EAGLE instrument for the E-ELT
16:00 Talk	[25+5]	Simon Ellis – FLEX OH suppression spectrograph
16:30 Afternoon break	[30]	
17:00 Talk	[25+5]	Marcus Hartung – High contrast imaging at Gemini
17:30 Talk	[25+5]	Peter Tuthill – Fidelity & dynamic range at the diff. limit
18:00 Discussion	[30]	

Friday

SESSION 5: New Concepts and Synergies

Chair: Schmidt

09:00 Talk	[25+5]	Simon Lilly – Observational cosmology in era of JWST
09:30 Talk	[25+5]	Andy Bunker – High redshift universe with ELTs/JWST
10:00 Talk	[25+5]	A. Swinbank – Galaxies under the cosmic microscope
10:30 Morning break	[30]	
11:00 Talk	[25+5]	Joss Bland-Hawthorn – New concepts in instrumentation
11:30 Talk	[25+5]	Patrick Roche – AO & mid IR astronomy
12:00 Talk	[25+5]	Andreas Quirrenbach – Optical interferometry
12:30 Talk	[25+5]	Charles Jenkins – Vortex coronagraphs for ELTs
13:00 Overview	[25+15]	Jerry Nelson & Reinhard Genzel

13:30 Meeting ends