

TAIPAN

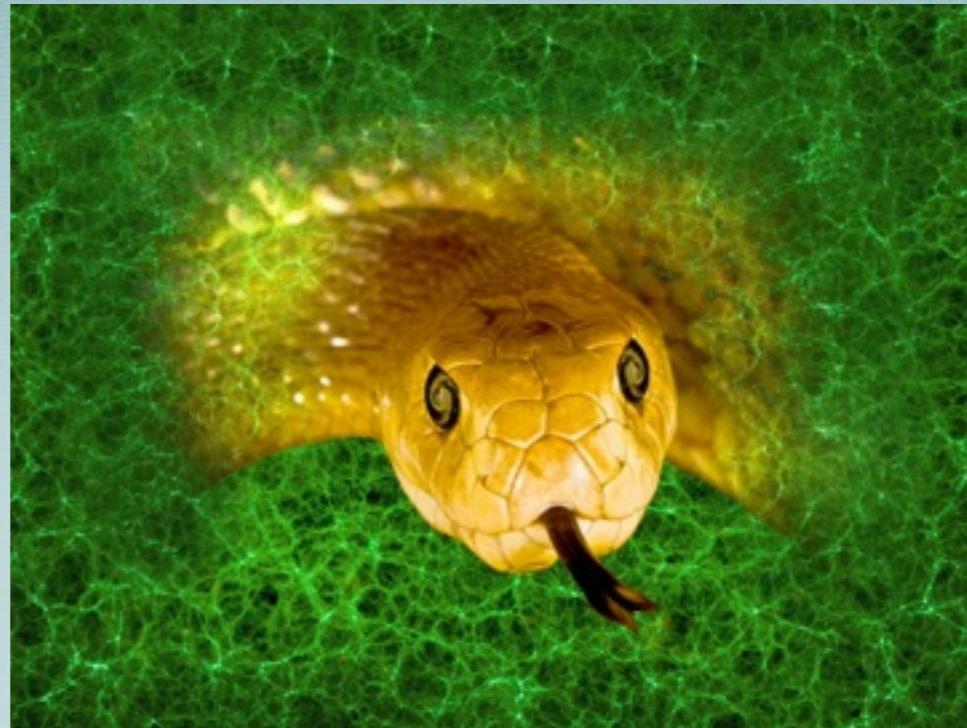
Andrew Hopkins

Australian Astronomical Observatory



Australian Government
Department of Industry





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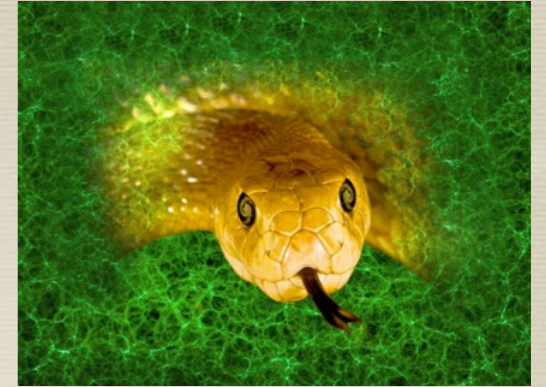






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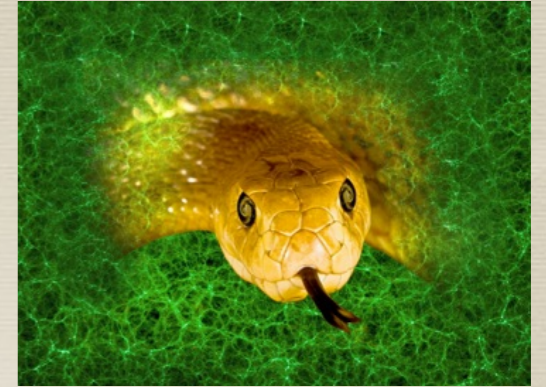
TAIPAN







-  Transforming Astronomical Imaging-surveys through Polychromatic Analysis of Nebulae
-  Survey with the UK Schmidt Telescope at Siding Spring, following in the footsteps of the 6dF Galaxy Survey (Jones et al., 2004, 2009)
-  All southern sky multi-object spectroscopic survey, ~500000 galaxies
-  30 authors on the original expression of interest to the AAO. The Taipan galaxy survey team now numbers more than 50, and there is an entirely new team, the FunnelWeb team as well.



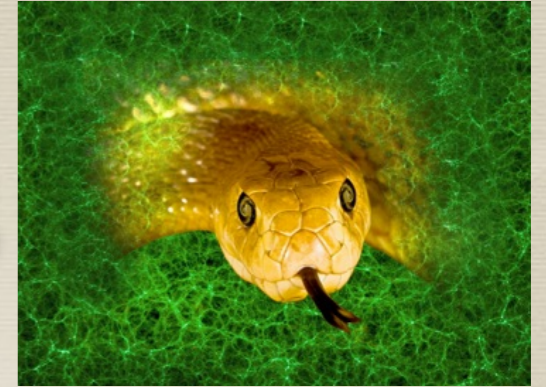
Nomenclature



-  TAIPAN: The galaxy survey, the spectrograph, the whole instrument, the project, plus potential confusion with FunnelWeb.
-  The galaxy survey: “**The Taipan survey**” or “**The Taipan galaxy survey**”.
-  The stellar survey: “**The FunnelWeb survey**”.
-  The instrument: “The UKST starbugs positioner” or “MANIFEST prototype”, plus “the TAIPAN spectrograph”. Refer to collectively as “**The TAIPAN facility**”.



Hardware status



All now funded! Work underway on each of the positioner, spectrograph and telescope refurbishment.



Starbugs positioner well underway. Preliminary demonstrations of prototype bugs and coherent polymer fibre bundles for auto-guiding and focal-plane characterisation on the UKST carried out in February. 150 starbugs for initial operations.



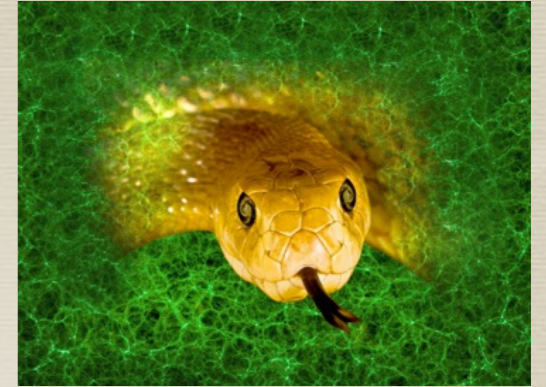
TAIPAN spectrograph: successfully funded through a LIEF proposal, and strongly supported by 12 institutions (out of 16 nationally with active astronomy research groups).



The UKST refurbishment: supported through AAO capital funding bid to Department of Industry, approved following success of LIEF proposal.



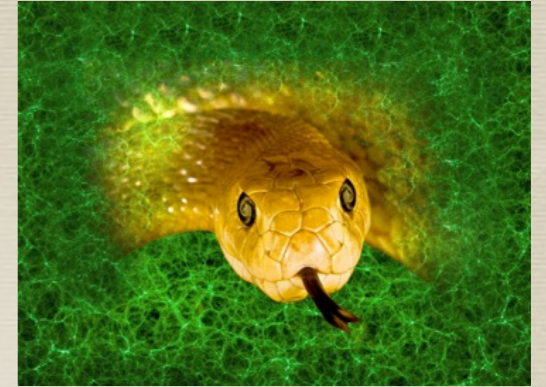
Scientific goals



- Three themes: **Cosmology, Galaxies, Stars**
- The “**Stars**” theme is addressed by the **FunnelWeb** survey, 20000000 stars to $V < 12$.
- The “**Cosmology and Galaxies**” themes are addressed by the **Taipan galaxy** survey.
- The key science goal for the Taipan survey is the 1% precision H_0 measurement.
- Additional science goals for the Taipan survey include:
 - Precision peculiar velocity survey
 - Galaxy evolution, transition, environment, fuelling




Team structure



Taipan survey team

Executive

 Andrew Hopkins (PI), Michael Brown, Matthew Colless, Scott Croom, Lee Spitler, Chris Tinney

Working groups

 Cosmology: Chris Blake & Chris Springob

 Galaxies: Michael Brown

<https://sites.google.com/site/taipansurvey/>

FunnelWeb team

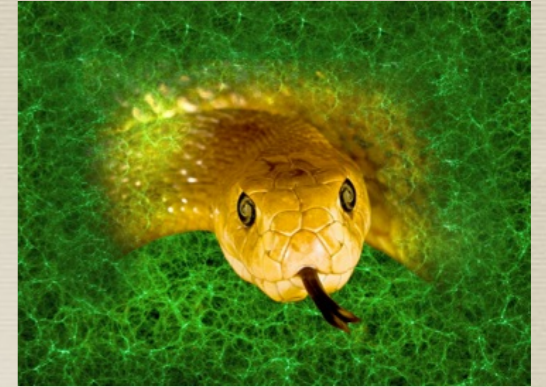
Executive

 Mike Ireland & Chris Tinney (co-PIs)

<http://funnel-web.wikispaces.com/>



SkyMapper

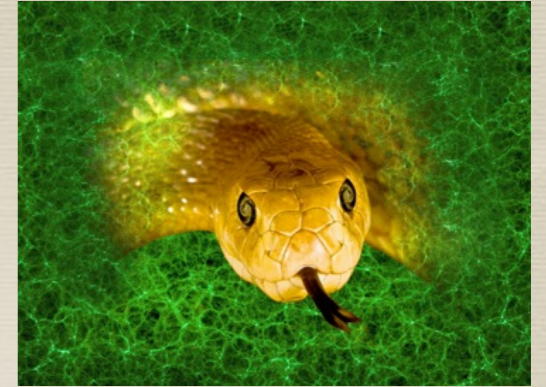


 SkyMapper and Taipan are intimately entwined.





SkyMapper




 Taipan galaxy survey input catalogues:


 SkyMapper (optical)

 VISTA Hemisphere Survey (near-IR)


 WISE (mid-IR)

 Photometric pre-selection desirable:

 optimise for mass/volume-limit in the galaxy survey,

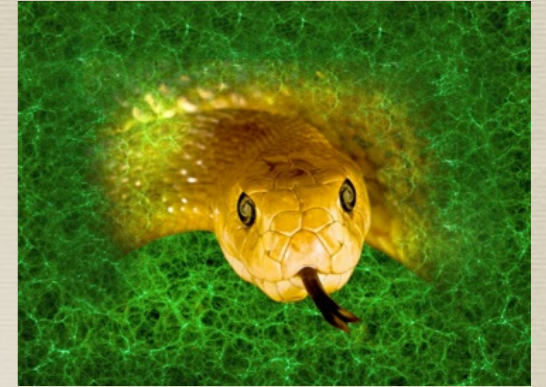
 photo-z preselection for the cosmology survey.






 Reliable photometry needed to quantify aperture effects

 Also, for galaxy photometry, want elliptical aperture photometry



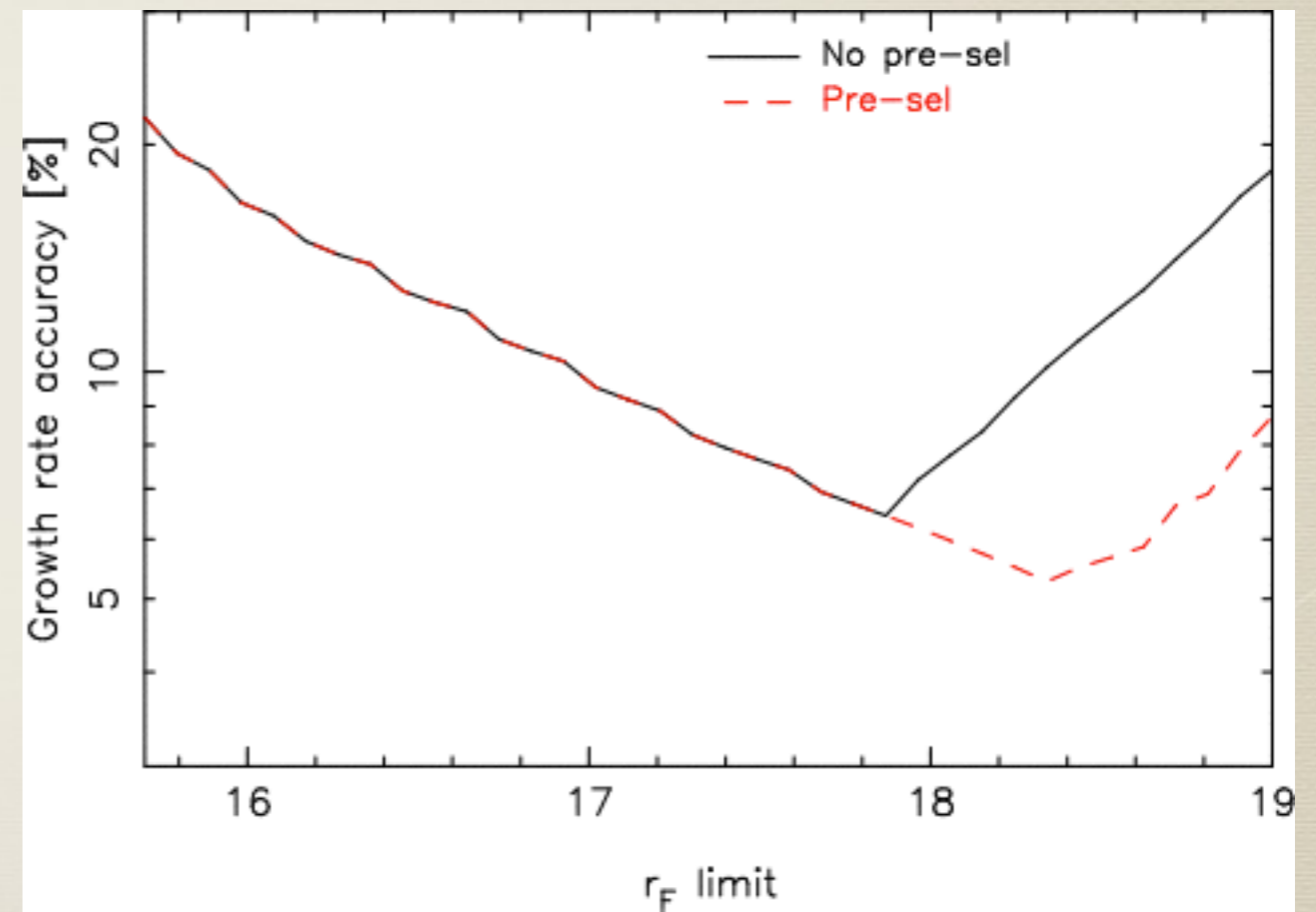
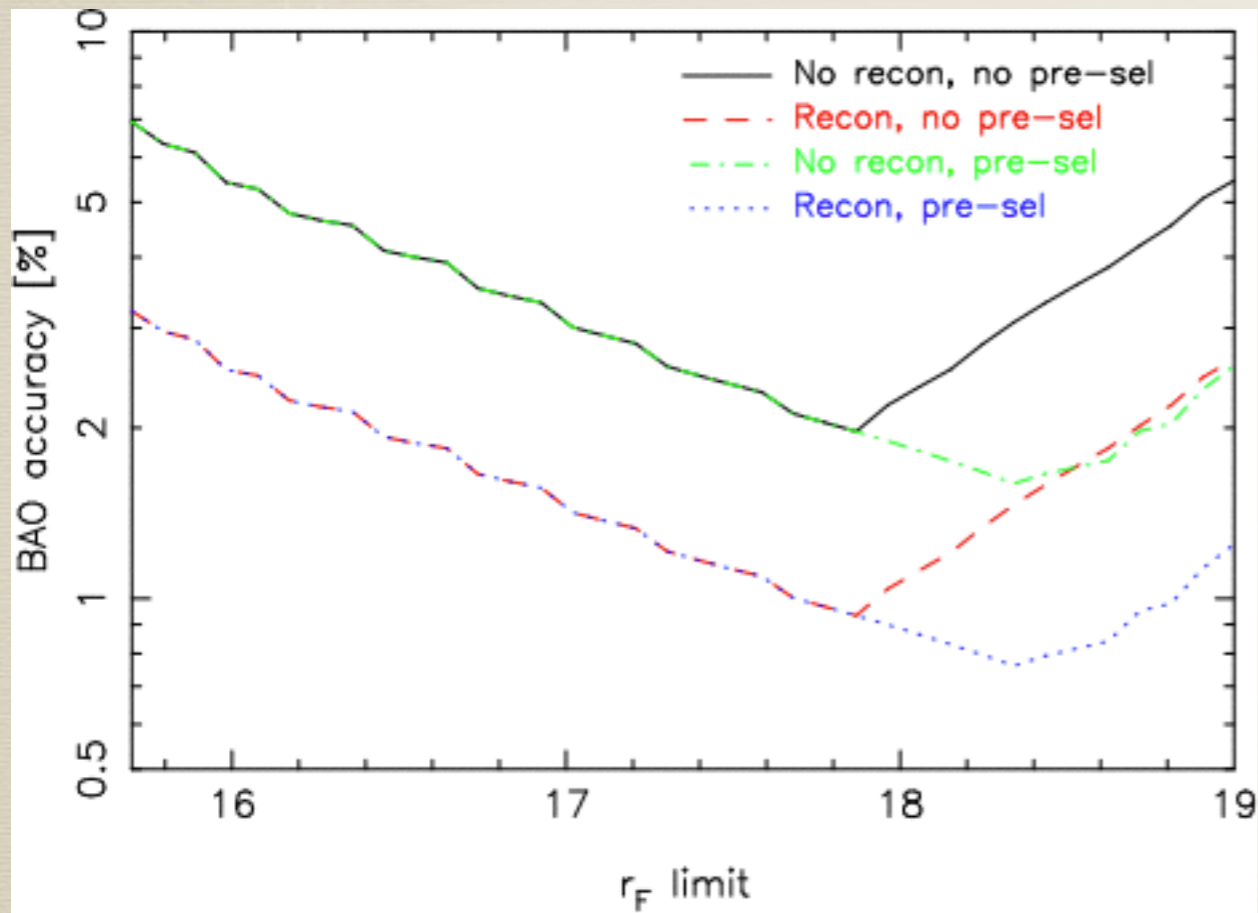
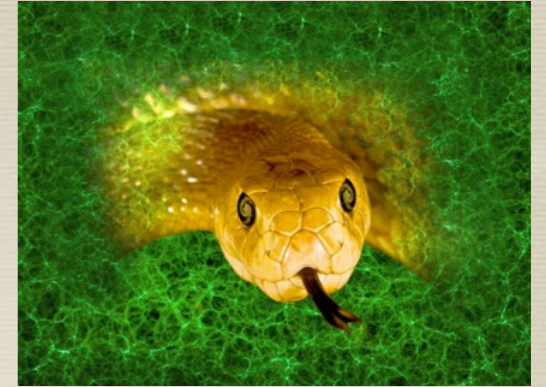
SkyMapper



-  SkyMapper and TAIPAN:
-  FunnelWeb: Clear synergies on the stellar survey properties, combining photometric and spectroscopic measurements.
SkyMapper bright limit?
-  Taipan galaxy survey: Primary connections with the galaxy evolution and the peculiar velocity surveys.
-  Multiwavelength photometry adds significantly to the capacity for analysing and interpreting the details of galaxy evolution (c.f. GAMA).
-  Robust galaxy photometry required for accurate surface brightness measurements, needed for the peculiar velocity analyses.



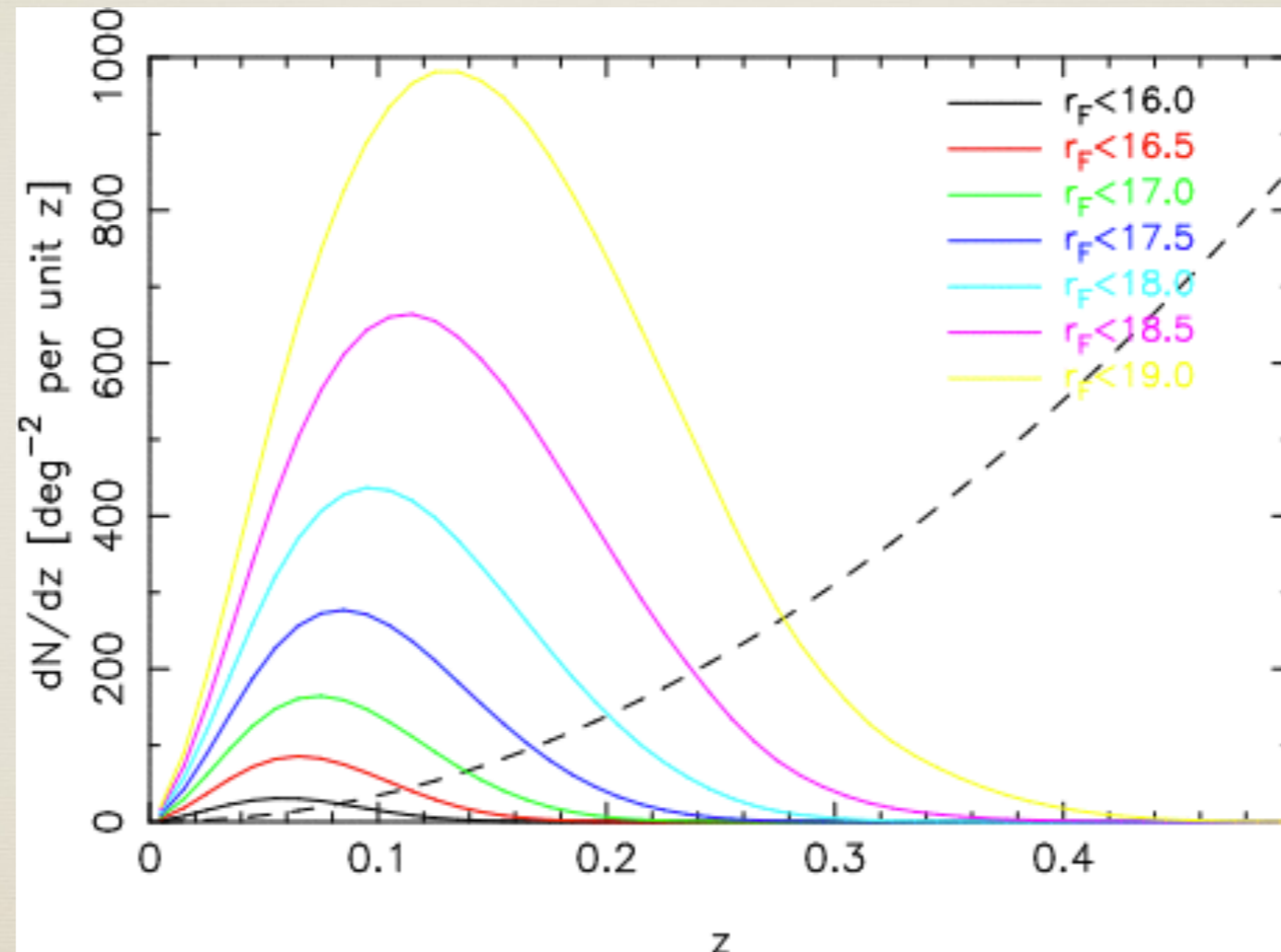
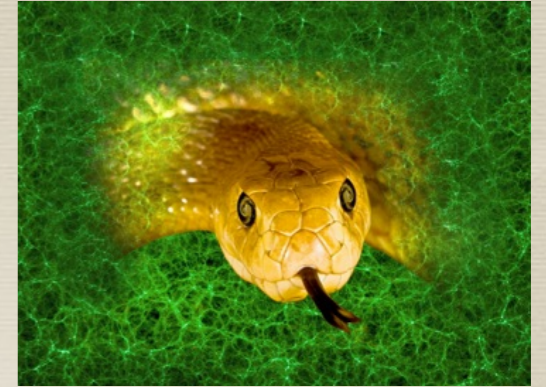
Cosmology



Credit: Chris Blake



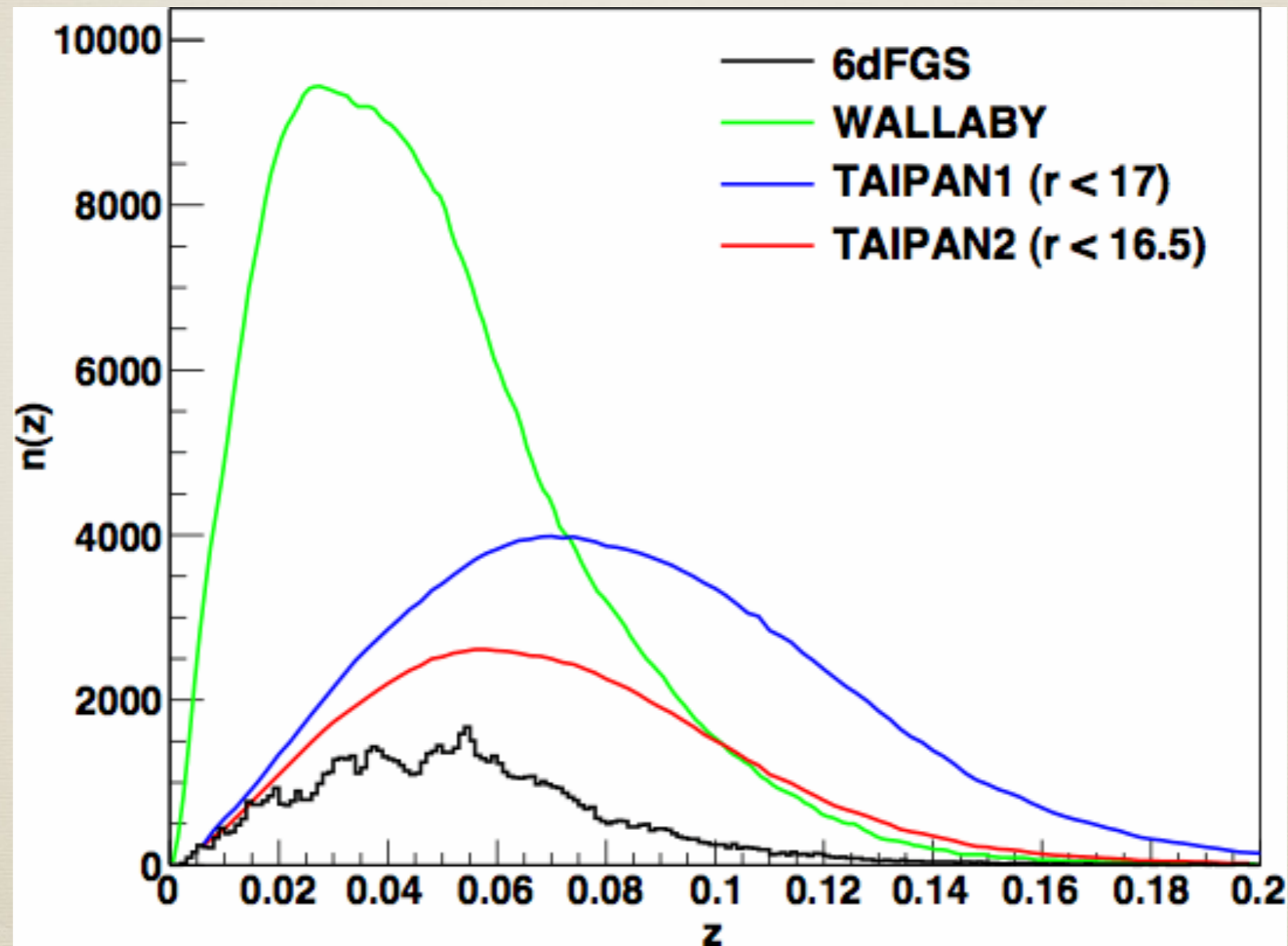
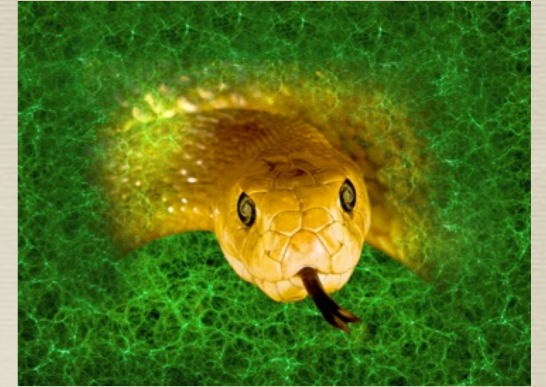
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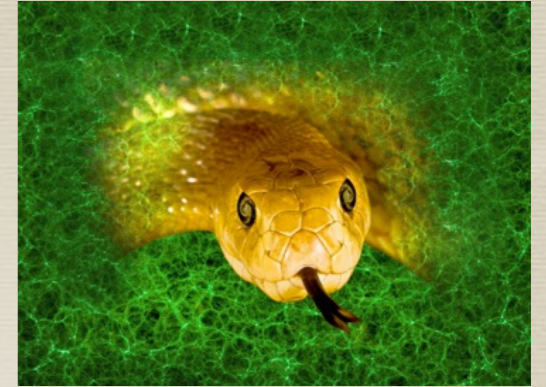
Galaxies








Beutler et al., 2011, MNRAS, 416, 3017



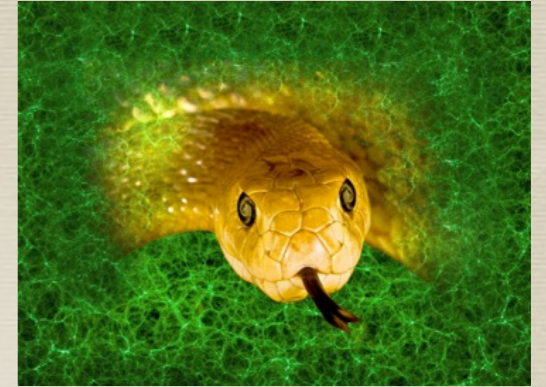
Galaxies



-  **The connection between gas and stars**
-  The transition of galaxies from active to quiescent
-  The role of environment, fuelling and quenching
-  Star formation and the role of AGN
-  **Legacy value**



Galaxies



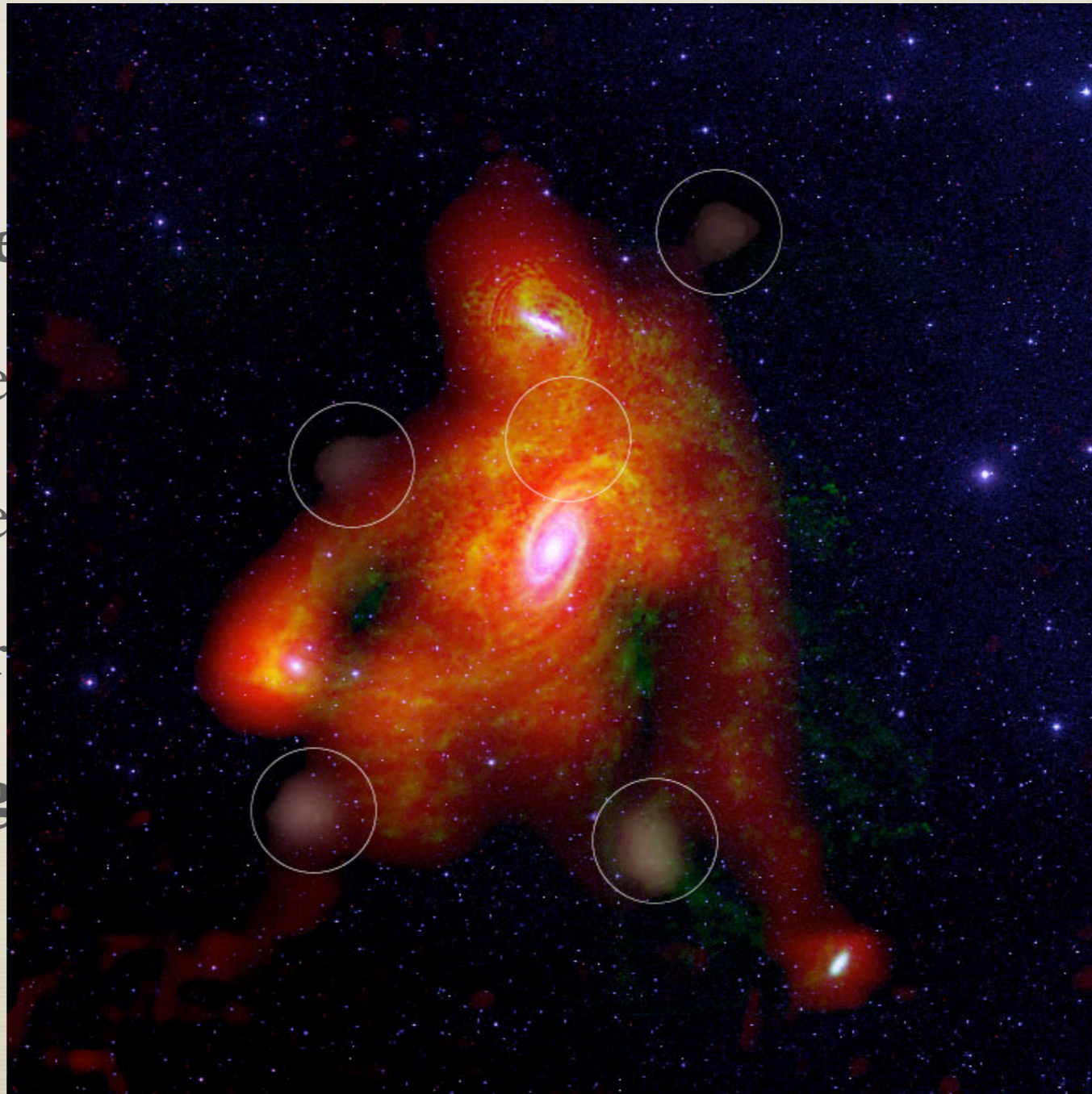
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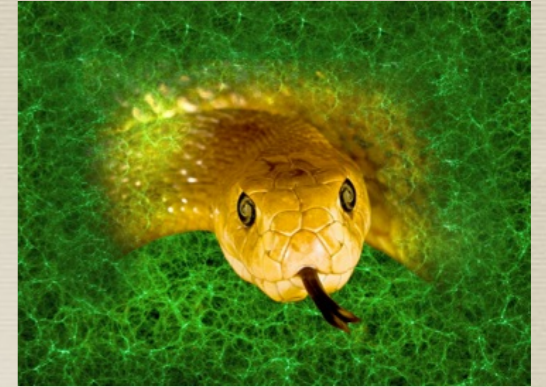
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Katie Chynoweth & NRAO



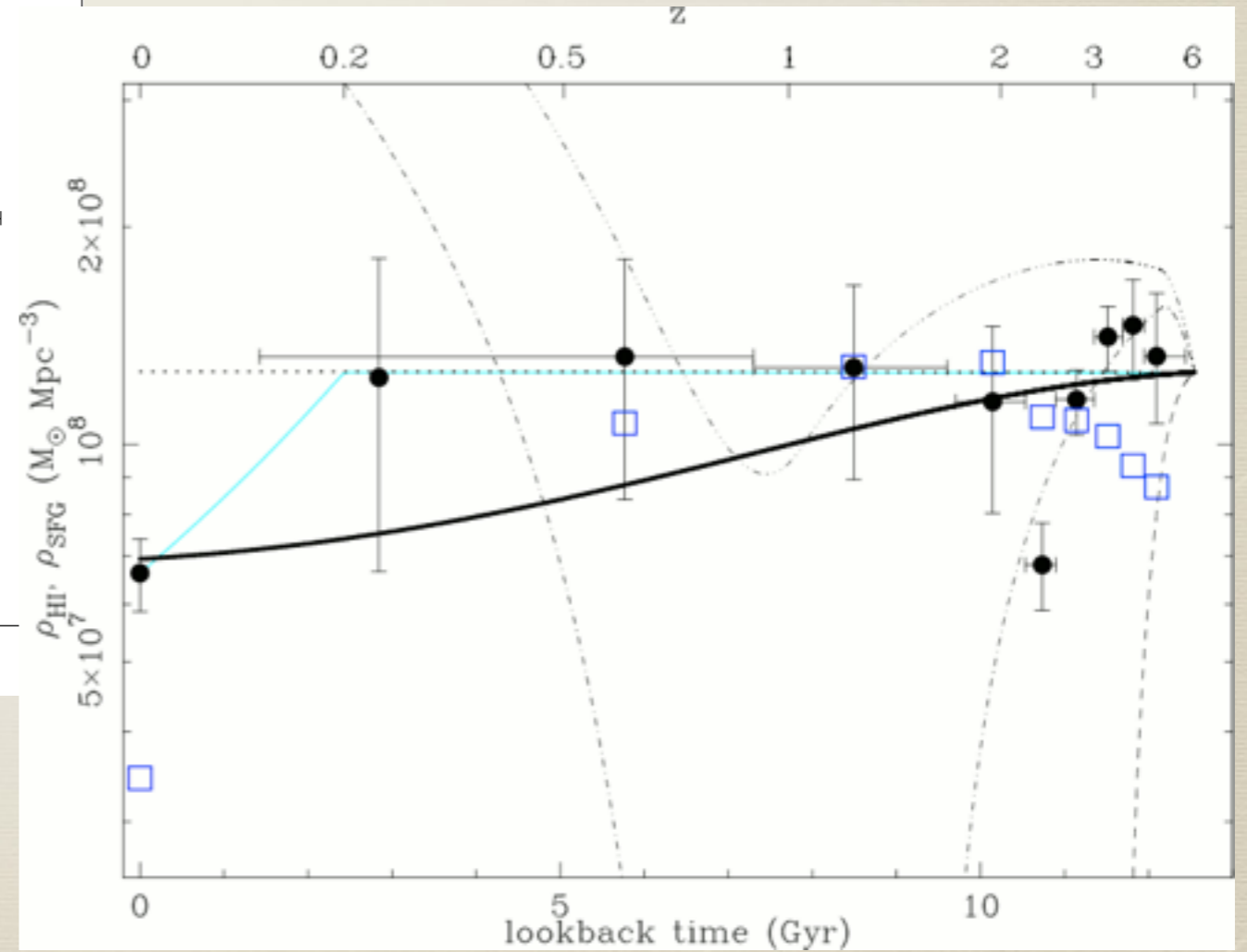
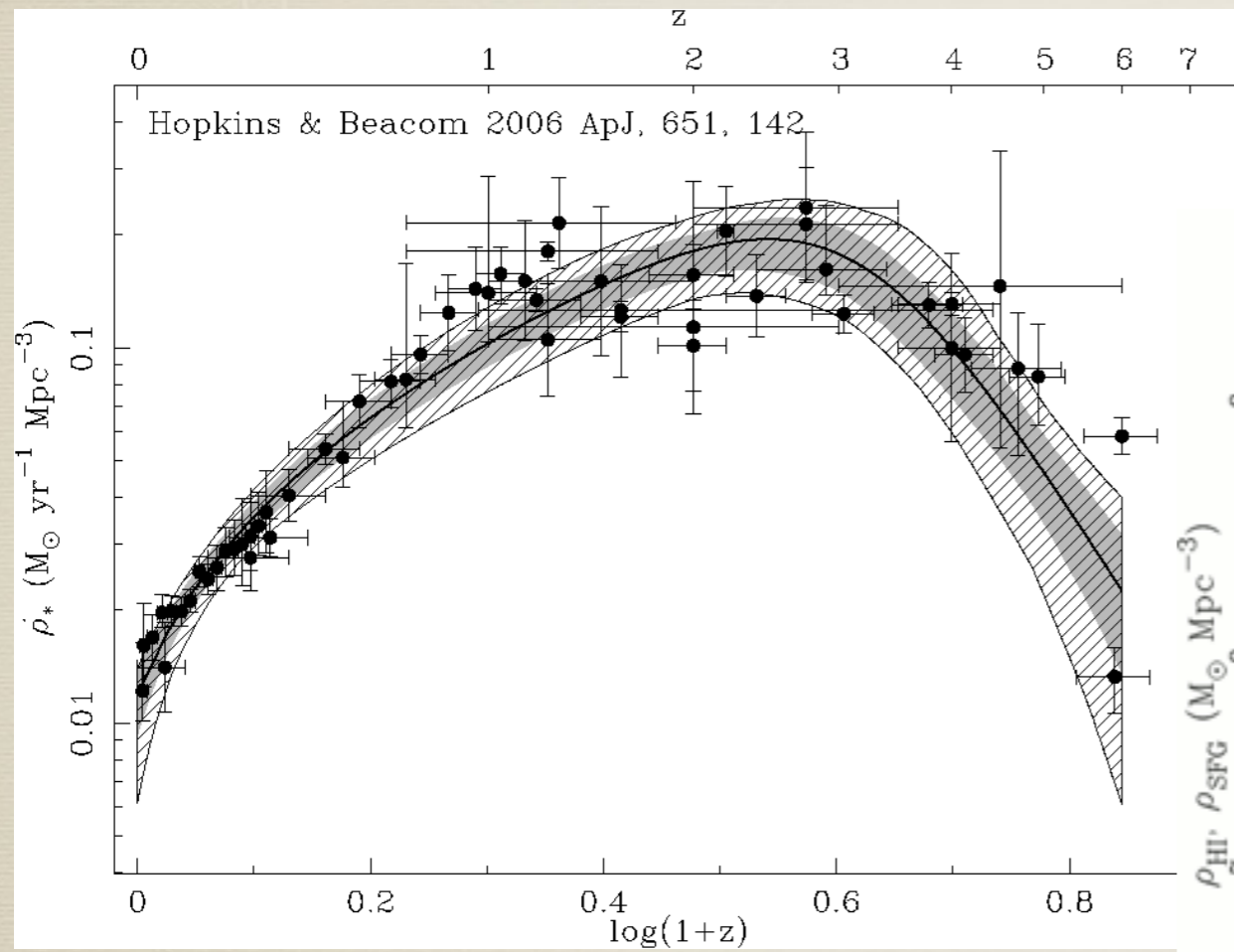
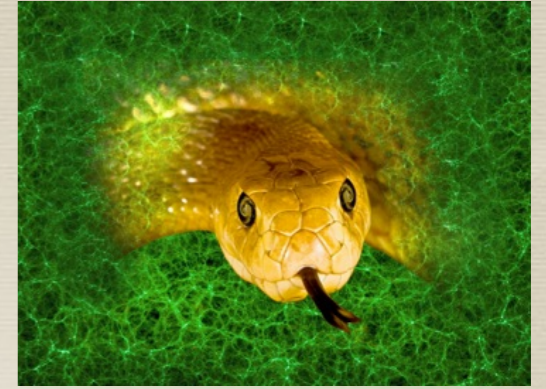
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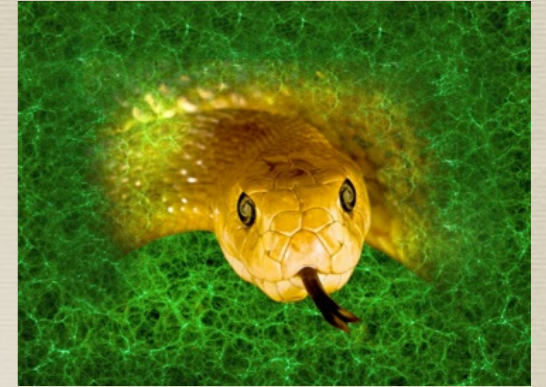
Stars and Gas








Hopkins, McClure-Griffiths & Gaensler, 2008, ApJ, 682, L13



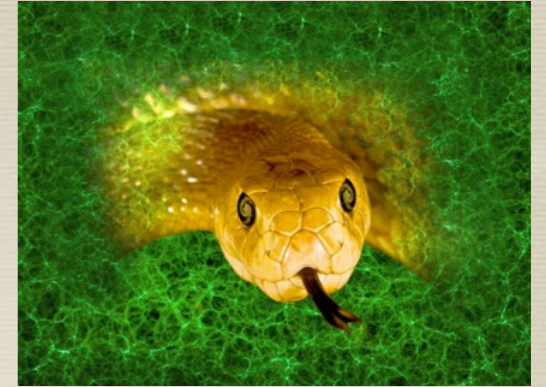
Galaxies







-  Working to identify optimum survey selection
-  Survey to $r < 17$ (c.f. SDSS at $r < 17.7$) compared to volume (mass) limited selection based on photometry
-  Possible tension between galaxy target selection and cosmology target selection
-  Targets for peculiar velocity survey may be more closely aligned to galaxy survey than H_0 /growth of structure survey
-  Challenge to minimise overall survey time requirement, aiming for a 5 year survey plan, encompassing both cosmology and galaxy science



Summary



-  Instrument + telescope funded, construction and refurbishment underway.
-  Taipan and FunnelWeb survey teams in place, key science defined, survey strategy being refined.
-  Taipan and FunnelWeb surveys to begin in 2016, with approximately 5 year duration.
-  Opportunities to get involved.