

Bob Nichol (ICG Portsmouth)

FUAP: FAR UNIVERSE ADVISORY PANEL

FUAP Official Remit

- Our science remit is *“parts of the astronomy and space science programmes concerned with the global properties of our galaxy, with objects beyond our galaxy, and with cosmology.”*
- *Our tasks are:*
 - ✓ Draft and maintain a roadmap describing current and future research opportunities in their areas, for presentation and approval by PPAN.
 - ✓ Consult and interact with the community to ensure its views are canvassed and there is an appropriate and effective route for communication with STFC on strategic programmatic issues.
 - ✓ Make an independent presentation to PPAN on the relevant panel area in years in which an STFC Programmatic Review takes place, thereby providing community input to the programmatic review process.

FUAP Membership

- **Sarah Bridle**
- **Anthony Challinor**
- **Chris Conselice**
- **Shude Mao**
- **Rob Fender**
- **Bob Nichol (chair)**
- **Paul O'Brien**

✓ A long-term science roadmap for the extragalactic community. This will inform PPAN and STFC of the far universe science priorities for the coming decade.

✓ A positive statement on the facilities, projects and experiments needed both today and in the future to achieve the science roadmap and maintain UK leadership in strategic areas.

✓ A broad view of the UK science productivity, which could include all aspects of a successful and healthy UK astronomical community.

Consultation

- ✓ We crafted an initial science strategy document and presented that for comment in June/July 2009. We received 98 responses.
 - ✓ Need to allow of the “unknown and unexpected”
 - ✓ Need some prioritization unless it’s useless
 - ✓ Concerns about cracks between different panels
 - ✓ Importance of theory
- ✓ We drafted final science strategy document which includes prioritization of the key science questions. This prioritization was based on our internal discussions ranking each question for
 - ✓ Excitement of the science area
 - ✓ UK reputation and leadership
- ✓ Town meeting in Leicester on Sept 14th (~50 people attended) followed by web-based form open until Sept 21st (~70 written responses).
 - ✓ Feedback on e-MERLIN, LISA and CTA
 - ✓ Worries about stealth prioritization of SKA & ELT
 - ✓ General happiness with questions/themes
 - ✓ Strong support for our critical priorities



Institute of Cosmology and Gravitation

[Home](#) > [Administer](#)

- ▷ [News](#)
- ▷ [ICG Members](#)
- ▷ [Research](#)
- ▷ [Research opportunities](#)
- ▷ [Talks, lectures, meetings](#)
- ▷ [External Links](#)
- ▷ [Contact us](#)

Welcome to the FUAP Feedback Form

11 September 2009 - 2:09pm — [Bob Nichol](#)

We provide here a short form to capture peoples comments on the FUAP Science Strategy document and FUAP spreadsheet of critical facilities. These documents will form the core of our recommendations to PPAN of STFC. Therefore, your comments will be much appreciated and will help inform the long-term vision of STFC. Please consult the [FUAP webpage](#) for more information.

All submissions by Sept 21st 2009 will be carefully considered

Thank you from FUAP

Name (mandatory): *

Please give name and title

Department or institution (mandatory): *

or institution

Email address (mandatory): *

Example of our consultation

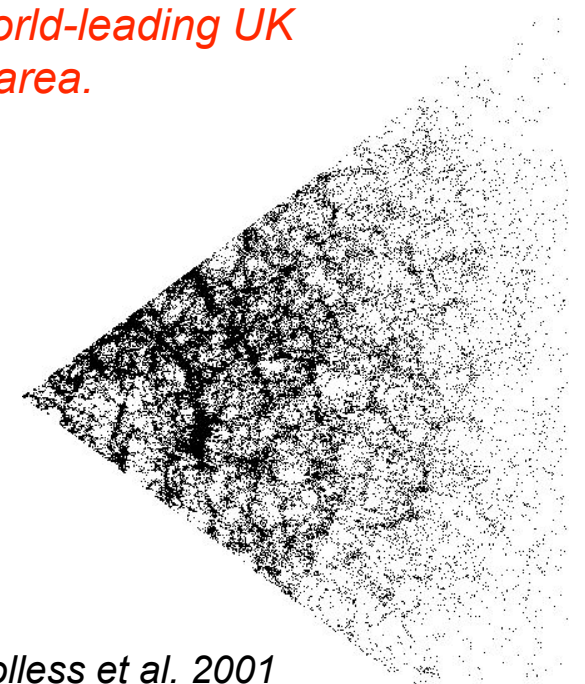
Cosmology

Rank	Cosmology
A	What is the nature of the dark matter and dark energy? (c1)
B	What are the physical laws that govern the beginning of the Universe? (c2)
B	Are the correct laws of physics and assumptions used when calculating cosmological evolution? (c3)
B	What is the origin of large-scale structures in the Universe? (c4)

An "A" ranked question is scientifically compelling with world-leading UK involvement (reputation and leadership) in that area.

"It is likely that large surveys of the Universe will continue to drive cosmology in the coming decades. The UK has a rich history in this field (e.g. APM, [2dFGRS](#), UKIDSS/VISTA), and should continue to play a leading role in forthcoming international CMB, radio, optical and infrared imaging and spectroscopic surveys. Moreover, the UK has underpinned this work with world-leading theoretical expertise and it is essential to maintain this if we are to capitalise on the scientific potential of our observational programmes "

Colless et al. 2001

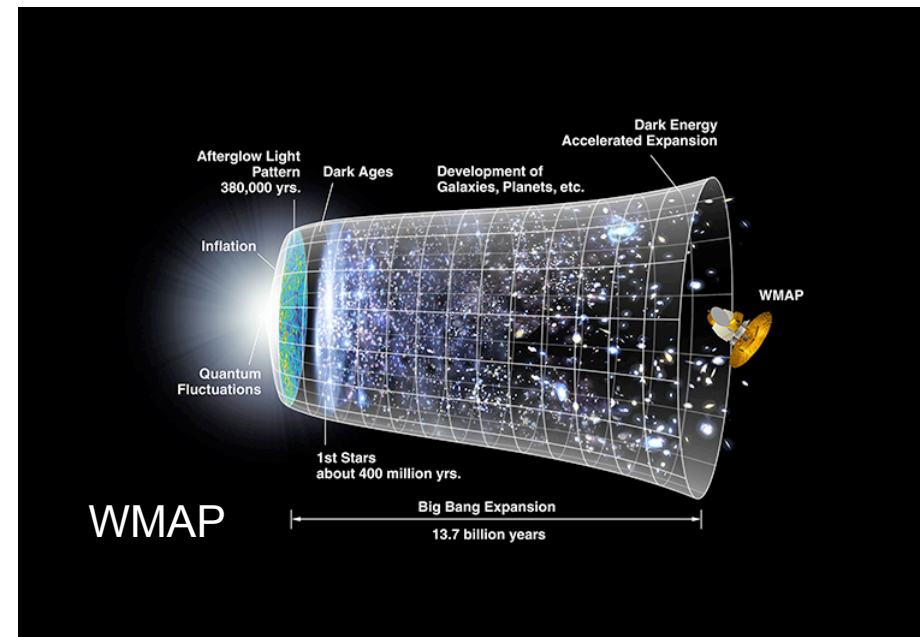


First Light

Rank	First Light
A	How and when did the first stars, black holes and galaxies in the Universe form? (f1)
B	How and when did the Universe become re-ionized? (f2)
C	What are the best ways to find these first objects in the Universe? (f3)
C	How and when did the Universe become enriched with all the complex elements we see today in galaxies? (f4)

An "A" ranked question is scientifically compelling with world-leading UK involvement (reputation and leadership) in that area.

“The UK has been one of the leading places for studying the earliest galaxies thus far discovered, and it will be important in the coming decades to expand this to the first objects to form in the Universe, and measurements of the epoch at, and before, re-ionization”

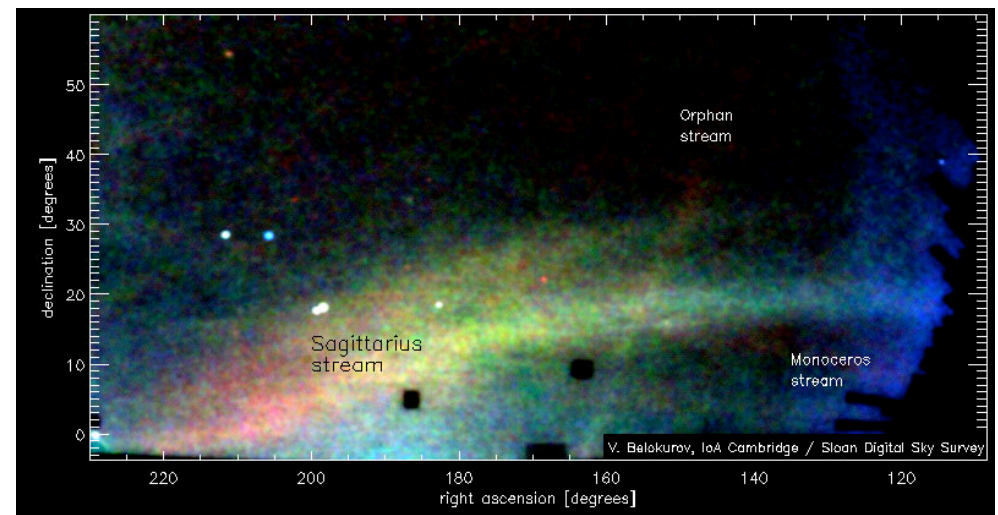


Galaxies

Rank	Galaxies
A	How do galaxies form and evolve? (g1)
B	What is the role of environment and interactions in galaxy evolution? (g2)
B	What are the contents of galaxies and their internal structures and mechanisms? (g3)
C	What lies between the galaxies? (g4)

An "A" ranked question is scientifically compelling with world-leading UK involvement (reputation and leadership) in that area.

The UK is leading the world in the interplay between the observational and theoretical study of galaxies. We should invest in this area to maintain our reputation and involvement in the next generation of observational facilities and high performance computing (HPC).



Belokurov et al.

Extreme Astrophysics

Rank	Extreme Astrophysics
A	What are the sources of gravitational waves? (e1)
B	Do the known laws of physics on Earth apply under extreme conditions in the Universe? (e2)
B	What is the astrophysics behind accretion of matter and energetic feedback around compact objects? (e3)
C	How and where does relativistic particle acceleration occur? (e4)

An "A" ranked question is scientifically compelling with world-leading UK involvement (reputation and leadership) in that area.

“The UK has an excellent track record in this area, both in constructing and exploiting facilities that make use of naturally occurring cosmic environments in our Galaxy, and beyond, to test the laws of physics. Extreme astrophysics is an area where we can learn much by comparing the properties of stellar-mass scale objects in the local Universe to massive objects in the distant Universe. To ensure continued UK leadership in this research, astronomers need a multi-wavelength view of the Universe, with high-resolution observations in time, frequency and space.”



Farrell et al. 2009

Crown Jewels

Not ranked within a theme or between themes

Vital to deliver a healthy and competitive world-class research base for the UK “Far Universe” community

Strong synergy with GBFR report. They have more detailed review of near-term facilities

Science themes and critical priorities	Now (next 5 years)	Future (next 20 years)
Critical Priorities	<ol style="list-style-type: none"> 1. Protect funding for people (grants, studentships, fellowships) to continue in the preparation and exploitation of data from facilities. 2. Maintain healthy funding for theoretical research including simulations (access to HPC) and modeling. 3. Leverage our subscriptions to ESA/ESO by improving our exploitation and involvement in these key facilities. 4. Maintain technological capacity in UK groups by investing in small-to-medium size astronomy projects, thus allowing people to be innovative and respond quickly. 	
Cosmology	<ul style="list-style-type: none"> • Wide-area weak lensing (WL) survey (c1, c3, c4) • Wide-area galaxy spectroscopic survey (c1, c3, c4) • Planck (c1, c2, c3, c4) • Ground-based CMB polarization experiment (c1, c2, c4) 	<ul style="list-style-type: none"> • Next generation wide-field WL survey (c1, c3, c4) • Next generation wide-field redshift survey (c1, c3, c4)
First Light	<ul style="list-style-type: none"> • 8-metre telescopes (f1, f4) • LOFAR EoR (f2) 	<ul style="list-style-type: none"> • 8-m class optical telescopes and ELT (f1, f4) • JWST (f1) • SKA (f1, f2)
Galaxies	<ul style="list-style-type: none"> • HST and 8m optical telescopes (g1, g2, g3, g4) • SCUBA-2 (g1, g3) • GAIA (g1, g2) • Herschel (g1, g2, g3) • e-MERLIN (g1, g2, g3) 	<ul style="list-style-type: none"> • JWST (g1, g3, g4) • 8-m class optical telescopes and ELT (g1, g2, g3, g4) • ALMA (g1, g3) • SKA (g1, g2, g3, g4)
Extreme Astrophysics	<ul style="list-style-type: none"> • LOFAR Transients (e3, e4) • XMM-Newton (e2, e3, e4) • Transient surveys and rapid large telescope follow-up in both hemispheres (e1, e3) • Advanced LIGO (e1, e2) 	<ul style="list-style-type: none"> • IXO (e2, e3, e4) • LISA (e1, e2) • SKA (e1, e2, e3, e4) • Access to large (8-m and ELT) optical telescope in both hemispheres for follow-up (e1, e3)

Final Comments

- ✓ Thanks to my panel and thank to the community.
I think we have the trust of the community!
- ✓ Need to keep us in the loop; allow panels to comment on next stages
Will lose community again if STFC ignores the panels advice and involvement
- ✓ More feedback from PPAN; a written remit?
What do we do next? Facilities? Science?
- ✓ Everything is public. See our webpage
<http://research.icg.port.ac.uk/wikis/fuap/>