Science Board
Presentation to IOP town meeting

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What is Science Board?

- There have been changes to the STFC Science Advisory Structure over the past year
- From 1st August 2011:
  - PPAN (particle physics, astronomy, particle astrophysics, nuclear physics, space and planetary science) and PALS (physical and life sciences) were merged with Science Board
- Science Board provides advice on
  - long term science and technology strategies for STFC
  - strategic scientific advice on STFC's non-scientific programmes, including impact programmes such as the Science and Innovation Campuses and Innovations programmes.
- We meet about 6-8 times a year
- Our business includes
  - Recommendations on Statements of Interest, Project Proposals, Strategic Issues, Grants, Programmatic Review +others

What is Science Board?

- Interacts with
  - Accelerator Strategy Board
  - Advisory Panels
  - Advisory Panel for Science in Society
  - Astronomy Grants Panel (AGP)
  - Education Training and Careers Committee
  - Futures Advisory Panel
  - Nuclear Physics Grants Panel (NPGP)
  - Particle Physics Grant Panel (PPGP)
  - Projects Peer Review Panel (PPRP)

  and
  - Council, via the Science Board Chair

Science Board Membership

- **Chairs**
  - **Professor Tony Ryan (Chair) – Sheffield University**
  - **Professor Matt Griffin (Deputy Chair) – Cardiff University**
- **Core Members**
  - **Professor Peter Butler, University of Liverpool**
  - **Professor Jon Butterworth, University College London**
  - **Dr Olwyn Byron, University of Glasgow**
  - **Dr Alison Davenport, University of Birmingham**
  - **Professor Martin Dove, Queen Mary University London**
  - **Professor Neville Greaves, Aberystwyth University/ University of Cambridge**
  - **Professor Alan Heavens, University of Edinburgh**
  - **Professor George Lafferty, University of Manchester**
  - **Professor Des McMorrow, University College London**
  - **Professor Bob Newport, University of Kent**
  - **Professor Steven Rose, Imperial College**
  - **Professor Sheila Rowan, University of Glasgow**
  - **Professor Robert Warwick, University of Leicester**
  - **Dr Alfons Weber, University of Oxford and STFC Rutherford Appleton Laboratory**

What is Science Board?

- Volume of work has expanded in new structure
- College of non-core Science Board experts established
  - Participate in Science Board sub-groups comprised of core and non-core members, to undertake specific tasks for a fixed period.
  - Attend Science Board to provide specific technical expertise during discussions regarding the peer review and oversight of the STFC programme, as and when required.
- Examples:
  - Science Board Sub-Group: Future of JCMT/UKIRT and ING
  - Science Board Sub-Group: Dark Matter Strategy

Science Board Membership

- **Non-Core Members**
  - Prof Gabriel Aeppli
    - - University College London
  - Dr David Barlow
    - - Kings College London
  - Dr Paul Beasley
    - - Siemens Technology and Concepts
  - Dr Julian Burke
    - - Leica Microsystems Group
  - Dr Francesca Di Lodovico
    - - Queen Mary University of London
  - Dr Jon Finch
    - - Centre for Ecology and Hydrology
  - Prof Sean Freeman
    - - University of Manchester
  - Prof Valerie Gibson
    - - University of Cambridge
  - Prof Stuart Green
    - - University Hospitals Birmingham
  - Prof Jon Goff
    - - Royal Holloway, University of London
  - Prof Melvin Hoare
    - - University of Leeds
  - Prof Peter Hobson
    - - Brunel University London
  - Prof Andrew Jaffe
    - - Imperial College London
  - Dr Thomas Keller
    - - GSK
  - Prof Valentin Khoze
    - - Durham University
  - Dr Ian Mercer
    - - University College Dublin
  - Prof Tom Millar
    - - Queen's University Belfast
  - Prof James Mitchell
    - - Universite de Rennes I
  - Prof Simon Morris
    - - Durham University
  - Dr Alex Murphy
    - - University of Edinburgh
  - Dr Zsolt Podolyak
    - - University of Surrey
  - Prof Andrea Russell
    - - University of Southampton
  - Dr Jasper van Thor
    - - Imperial College London
  - Dr Dan Tovey
    - - University of Sheffield
  - Dr Liz Towns-Andrews
    - - University of Huddersfield
  - Prof Matt Zepf
    - - Queen's University Belfast
  - Prof Albert Zijlstra
    - - University of Manchester

Advisory Panels

- Consultation on the form and role of Advisory Panels
- Community input gathered and considered
- 7 panels reporting to SB - currently being constituted
  - Particle Physics AP
  - Nuclear Physics AP
  - Particle Astrophysics AP
  - Astronomy AP
  - Solar System Science AP
  - Physical Sciences and Engineering AP
  - Life Sciences and Soft Materials AP
- Remit of the Advisory Panels
  - Provide Horizon scanning input for long term strategy planning
  - Provide input on CSR/Programmatic review priorities
  - Contact point for communication with the community

What has happened in the last year …

- To a large extent we still have the overall program produced by the last programmatic review/CSR round
- Efforts being made to look at how we move forward and try to support aspirations to broaden the programme in an environment that is still constrained

Astronomy

- Grants – received reports from the AGP on new consolidated grant round – noted the high quality work being funded and noted the level of high quality work that could not be supported
- SKA and ELT progress – Science Board noted and re-endorsed the importance of these to STFC's science programme.
- Future funding opportunities included the continuing wish from the astronomy community to contribute to a range of spectroscopic instrument opportunities, concern about lack of northern hemisphere access.
- Very few funded projects exist, so ability to create headroom was much reduced. However E-ELT scheduling could release limited short-term funding.
- Before its dissolution PPAN formed a subgroup augmented by additional experts to consider proposals for wide-field spectrographs for ground based telescopes
  - 4 of these receiving some low level of design funding preceding further review
- Reviewing status of involvement in ground-based telescopes (ING and JAC)

Particle Physics

- Science Board
  - received SoIs for Phase 1 construction and Phase 2 R&D for upgrades to CMS and ATLAS – proposals invited
  - received an SoI for completion of tracker module for SuperNEMO – proposal invited
  - Received a written update from the PPAP on the status of the field
- Particle Physics Consolidated Grant proposals recently submitted
- PPAN was/Science Board is aware that
  - a number of important projects had been assigned an alpha 3 grading in the last programmatic review.
  - It is important to fund some additional small activities to keep some options for the future and some vitality in the programme

Particle Physics

- There is no new funding, however
  - flexibility given to the grants panels to award a small number of posts (or fractions of posts) based on scientific excellence to introduce a "bottom up approach" to funding breadth across a research area
- Science Board expects to receive preliminary information on the PPGP grants round over the next two months

Particle Astrophysics

- After the last programmatic review, gravitational waves was the only area of PA left funded
- Programme very lacking indeed in breadth
- Last town meeting: PPAN received an outline concept for a PA Virtual institute
  - Concentrating on two areas Dark Matter, VHE gamma ray astronomy
- PPAN recommended the PA community submit two Statements of Interest (SoI):
  - One from the UK dark matter community –aim for a single proposal for a coherent UK programme to retain skills and expertise for eventual participation in one future dark matter experiment;
  - a second proposal should be submitted to retain a presence in the European CTA activity as this developed.
- PPAN recommended that any such funding should be provided from the astronomy and particle physics grant lines.

Particle Astrophysics

- Proposals received and reviewed by PPRP
  - Science Board recommended funding for CTA
  - Science Board retained a wish for UK involvement in Dark Matter research but did not agree funding for the proposal presented
  - Science Board subgroup on Dark Matter Strategy set up to work with the Community to develop a coordinated strategy for UK involvement that could potentially position the UK for leadership in direct dark matter searches
    - Dan Tovey (Chair), Val Gibson, Andrew Jaffe, Christian Speiring
    - Matt Griffin acting as Science Board contact

Nuclear Physics

- NP Grants. PPAN before its dissolution received and approved a report from the NPGP in 2011– noting the ongoing pressure on the grants round. Issue with the shortage of capital funding identified was resolved.

- The UK is participating in the construction of the NuSTAR experiment at the Facility for Antiproton and Ion Research (FAIR) in Germany.
- The UK contribution to FAIR is not large enough for the UK to qualify as a Shareholder of FAIR GmbH
- Consequently, the UK was not involved in any discussions of future scientific strategy influencing facility operation
- The FAIR Council created an Associate Partner status – reduced cost, finite lifetime status

- Science Board, after taking input from the Community, advised STFC to proceed in the UK joining FAIR as an associate member (now approved by Council), noting the community's desire to maintain breadth of involvement across a range of appropriate facilities.

Nuclear Physics

- After the last Programmatic Review only one funded construction project (NuSTAR) remained. If the current position remained, there would be no construction projects within nuclear physics after 2015.

- PPAN had recommended the nuclear physics community should be consulted in the very short term re the balance of investment in the NP programme with respect to future NP projects.

- The NP community has held three meetings (May 11, Nov 11 and Feb 12) to discuss future directions, science cases and prepare future SoIs for submission to STFC.
  - A number of new developments are being considered, including future UK contributions to the Jefferson Lab upgrade in the US, future ISOL facilities, and upgrades for the ALICE, AGATA and NuSTAR detectors.
  - Recognises the need to synchronise with the programmatic review, even if plans are not yet mature.

Programmatic Review

- Last review finished late 2009 with a 2010 CSR
- Time has passed..
- Preparations for an upcoming review in 2012/3 ongoing
- Establishment of the APs is first vital step

Goals:

- Evaluate the recent, current, and likely future scientific excellence, operational effectiveness, and impact of the scientific aspects of each of STFC's programmes;
- Identify any aspects of STFC's programmes that are less well-matched to the Council's strategy and to make recommendations concerning the future of these activities;
- Consider future programme opportunities and make recommendations on how these could be taken forward;
- Evaluate the balance of STFC's programmes and to recommend a future research portfolio

- Important to make sure that
  - changes in focus and strategy in each relevant field are properly feeding into our current and planned programme
  - we are prepared for any upcoming CSR (2014? 2013?)

In summary

- We are working to both support the currently planned programme and where possible try to find creative ways to expand breadth and support new aspirations

- Review of the programme coming soon - this will position us for the next CSR – need to help make (again) the case for STFC's research

Results of the last prioritization

Alpha 5
Advanced LIGO
ATLAS
ATLAS Upgrades
CMS
CMS Upgrades
GAIA
GridPP
Ground Based Gravitational Waves
Herschel post-launch support
JCMT
JWST – MIRI
KMOS
nEDM
Rosetta post-launch support
Planck post-launch support
VISTA exploitation

- Alpha 5 projects were supported at a reduced level

Additional programme

Alpha 4
Aurora ESA subscription & national programme
Cockcroft
Cosmic Vision R&D
Dark Energy Survey
E-ELT R&D
E-ELT subscription
ExoMars
Hinode post-launch support
IPPP
LISA R&D
LISA Pathfinder post launch support
nEDM upgrade
Neutrinoless Double Beta Decay
NUSTAR
LHCB
SKA R&D
Solar Orbiter R&D
SNO+
Stereo post-launch support
SUPERNEMO
SuperWasp operations
SWIFT post-launch support
T2K
Zeplin III

With reductions it was just possible to fund the alpha-4 projects at a reduced level
This still did not balance the budget in all years, but was accepted as a basis for planning

What was left remained unfunded

Alpha 3
AGATA
ALICE
ANITA
AUGER
Cassini post-launch support
CDF
CLIC
Clover
Cluster post-launch support
CTA
D0
eEDM
Einstein Telescope
e-MERLIN
Eureka
ING
Inverse Square Law (ISL)
JPARC Neutrino
LHCB Upgrades
Linear Collider Detector R&D
LOFAR
Low-mass Support Structures for Silicon Detectors.
Lux-Zeplin
NUSTAR additional
MICE
PANDA
Particle Flow Calorimetry
ROSA exploitation
SOHO post-launch support
SPIDER
SPIRAL2
UKNF
Venus Express post-launch support
XMM post-launch support

Alpha 2
ALMA Regional Centre
CCAT
COMET
ELENA
Gemini
JIVE
Liverpool Telescope
LSST
MINOS
MROI
NA62
UKIRT
UKIRT Planet Finder
Alpha 1
BepiColombo
Boulby underground facility
EISCAT
JAI
LHeC
NG1df
SUPER B
Below Alpha
MoonLITE

In some cases there has been limited continuing support to avoid pulling out abruptly. Some supported by some additional funding from RCUK