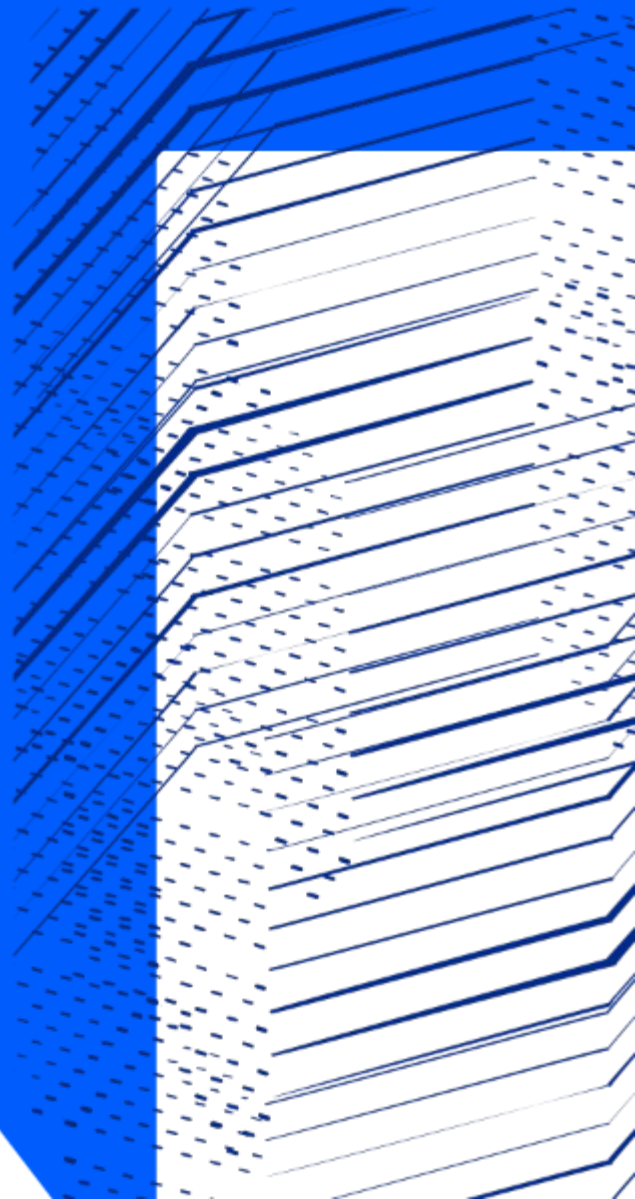
Science and Technology Facilities Council

STFC Update
RAS Forum

Professor Mark Thomson
Executive Chair

1 November 2023



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General News

STFC Astronomy Team

Key Contacts:

- Associate Director: **Jenny Hiscock**
  - Colin Vincent retired 30 Sept 23
  - I am sure you will join me in thanking Colin for his many years of service to the Astronomy Programme
- Head Astronomy Awards: Kim Burchell
  - Senior Programme Manager: Chloe Woodcock
  - Programme Managers: Justyna Misior
- Head of Astronomy Facilities: Chris Woolford
  - Programme Manager: Michelle Cooper
- SKAO: George Madden (on secondment 1 November – 30 April 2024)
  - Programme Manager: Simon Haynes

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House of Commons Astronomy Inquiry

We welcome the HoC S&T Committee inquiry: Key messages from STFC

- The UK is a key player in large-scale international projects, including SKAO and ESO's ELT. UK scientific influence and leadership on the global stage
- STFC's high-level plans for astronomy are set out in our Strategic Delivery Plan:
  - commitment to year-on-year increases in support for scientific exploitation of our major investments (CG uplift)
  - new funding for early-stage R&D and, in partnership with Innovate UK, uplifted funding for downstream commercialisation
  - New investments in capital projects: e.g. Simons, …
- Strategy informed by deep advisory structure & linked to international strategies
- A key pillar of our strategy is to use the inspirational science in our astronomy and particle physics programmes to inspire the public.

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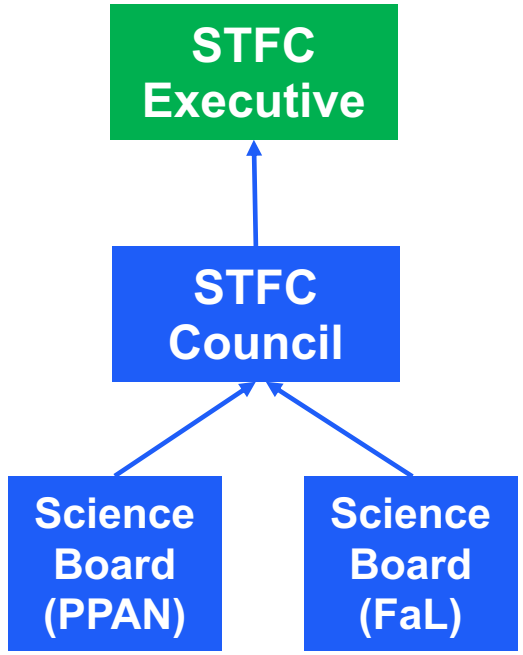
Rebooting Science Board

Improving our governance structures

Overall Structure

- **STFC Executive Chair and STFC Executive Board**
  - Decision-making with responsibility for STFC budgets
- **STFC Council**
  - Advisory to STFC Exec Chair and STFC Exec Board
  - Our **top-level advisory body** where all aspects of STFC come together, PPAN, Facilities and Laboratories, Innovation, …
- **Two New STFC Science Boards**
  - Major change to enable more *focused and detailed* scientific/technology advice to STFC Council
  - Charged to deliver **prioritised roadmaps** within financial envelope
  - Chairs: Keith Grainge (PPAN) and Jacqui Cole (Facilities & Labs)



Science Board (PPAN)

Key functions

- Providing strategic scientific advice on the STFC Particle Physics, Astronomy and Nuclear Physics (PPAN) programme
- Providing strategic policy advice including development of a **long-term prioritised roadmap** to set the guiderails on future investments
- Prioritising projects/programmes **within the context of the 10-year plan** including:
  - Taking account of health and breadth of discipline
  - Maintaining appropriate support to ensure return on past investments
  - Exploiting UK leadership and capability in strategically important areas
  - Removing funding silos within core programme, e.g., particle astrophysics.
  - Engaging in future projects
- Referring projects/programmes to peer review

Developing the PPAN Roadmap

The PPAN Roadmap comprises three main elements:

- Assessment of the research landscape
  - external PPAN research landscape (nationally and internationally)
  - current state of the PPAN programmes, including current investments and UK capability
  - balance across exploitation, capital investments, R&D, early careers
  - risks/pressures associated with current investments
- Future vision
  - advise on the vision for the future programme
  - consider science drivers e.g. technology development, laboratory infrastructure, building capability/skills, impact/value
  - ask *'What does the ideal programme look like in 10 years?'*
- Recommendations on the programme and funding in context of the 10-year plan.

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Funding Update

Our 3-year strategy: FY22/23 – FY24/25

What we are doing:

- An increase of £19 million (6+13) over this SR period for STFC-supported frontier research programmes ➡ **very significant uplift to Consolidated Grants**
  - e.g. 39 additional PDRAs to 17 university groups in particle physics experiment + proportionate uplift in particle physics theory (impact on astronomy see later slide)
- **UKRI Infrastructure Funding for:** SKAO, US Simons Observatory (in Chile), and "preliminary funding" for the ELT and next generation GW
- Investment in novel technologies
  - new early-TRL R&D scheme – rising to £2.5 per annum
  - new (simplified) commercialisation scheme
- Commitment to maintain numbers of PhD students despite increased costs (stipends)

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Other Progress: Infrastructure Fund

Developing future infrastructure opportunities: IF scoping funding

- **Boulby Underground Laboratory: Dark Matter and more** – £2.8 million total
- **Diamond-II scoping project** – £5.3 million total
- **Electron-Ion Collider (EIC) scoping project** – £2.9 million total
- **Ion Therapy Research Facility scoping project** – £2 million total
- **ISIS-II feasibility, design studies and R&D** – £5.1 million total
- **Relativistic Ultrafast Electron Diffraction and Imaging (RUEDI) scoping project** – £3 million total (funded via EPSRC) to be based at Daresbury
- **XFEL: conceptual design and options analysis** – £3.2 million total
- **Next generation Gravitational Waves** – £8 million total
- **Second generation ELT instruments** – £6 million total

These projects provide a pipeline of potential future investment opportunities

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Forward plan for PPAN

We have an initial "rolling" 10-year plan for the entire PPAN programme

- We have **started** to address the imbalance between our national investment and international subscriptions (CG uplift) - applies to all PPAN areas
- FY23/24 and FY24/25 uplifts are reversing previous trends, but this is not the end
- The current aim:

Annual costs/funding relative to 2022	This SR		Planning line for next SR		
	FY23/24	FY24/25	FY25/26	FY26/27	FY27/28
Required uplift (CG + R&D)	+£6M	+£13M	*+£18M*	*+£24M*	*+£30M*
Early-stage R&D funding	£1M	£2.5M	*~£3M*	*~£4M*	*~£4M*

- This approach will restore PDRA numbers to levels last seen in ~2010
  - affordability will require continued internal prioritization of activities
  - + some changes to the way we work, e.g. increased leverage of UKRI-wide initiatives such as the Infrastructure Fund

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Astronomy Grants

First year of moving away from Consolidated Grants:

- Following the review and subsequent Implementation Panel (chaired by Jim Wild), phased roll out of the new scheme is underway:
  - Small awards: 1-3 years
  - Large awards: up to 5 years and 3-5 PDRA
- Small awards 1st round completed and grant awards expected soon
- Large awards:
  - Expressions of Interest (31 October 2023)
  - Review panel will select maximum 10 applications to submit full proposal in March 2024
  - Expect to award 4 large awards in 2024

Astronomy Grants

Small Awards Scheme Headlines:

- First round of the small awards scheme went smoothly
- Panel commented that average quality of submissions seemed higher this year
- Consortium proposals were seen as very successful
- Funding uplift to exploitation programme has started to reverse recent downward trends in **numbers of PDRAs**
  - **16% increase in the 2023 round – this is just the start**

Application Information*	**2023**	2022	2021	2020
Number of individual applicants (PI & CoI)	**237**	213	238	288
Number of projects	**174**	186	197	249
Requested PDRA staff years	**513.7**	537	582	713
Requested Technician staff years	**25.5**	32	22	27
Consortium applications	**16**	2	3	5

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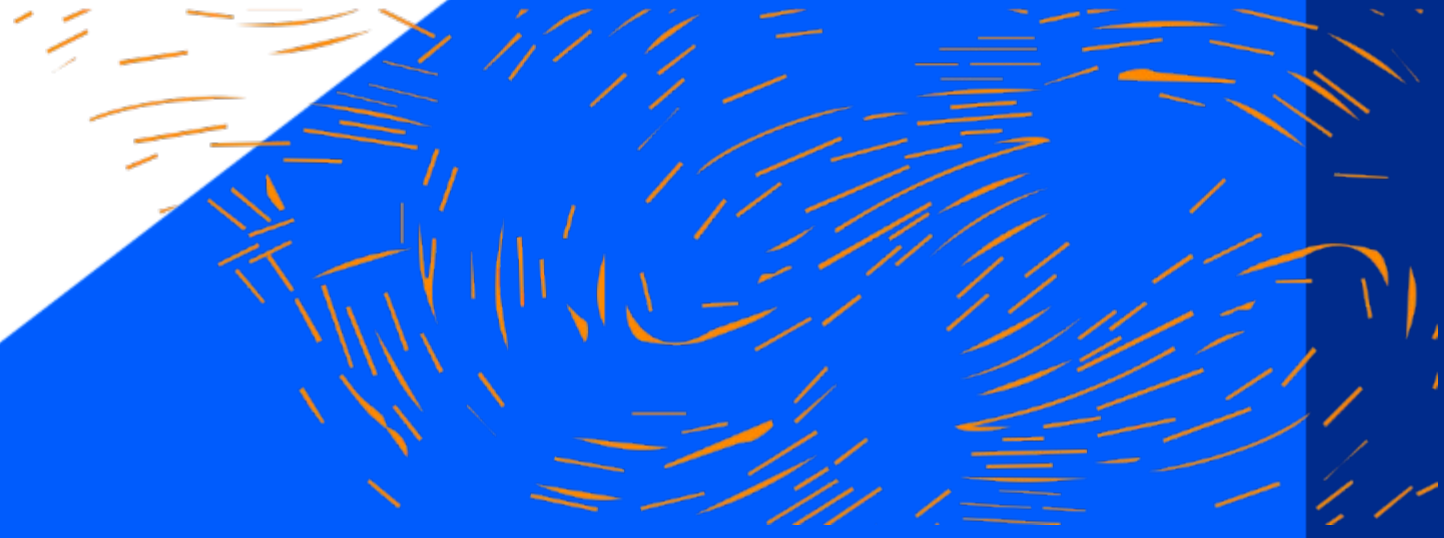
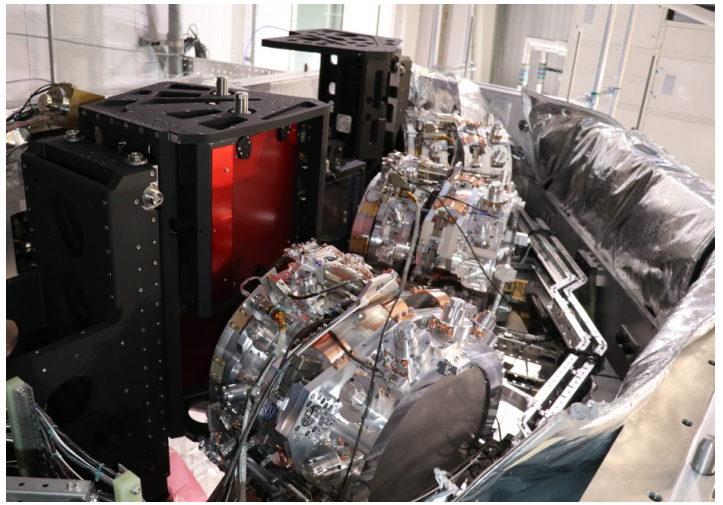
Astronomy Highlights



ESO

Headlines

- ELT construction work in Chile is rapidly progressing in Armazones with 50% of the ELT constructed.
- HARMONI making good progress. STFC support for METIS, MOSAIC and ANDES, plus R&D in Planetary Camera and Spectrograph just renewed at £20M
- UK ELT Programme: **additional £6.8M from the UKRI Infrastructure Fund** to co-lead work packages on the next generation ELT instruments
- MOONS for the VLT making excellent progress at UKATC: Provisional Acceptance expected early 2024
- CUBES for the VLT also making good progress



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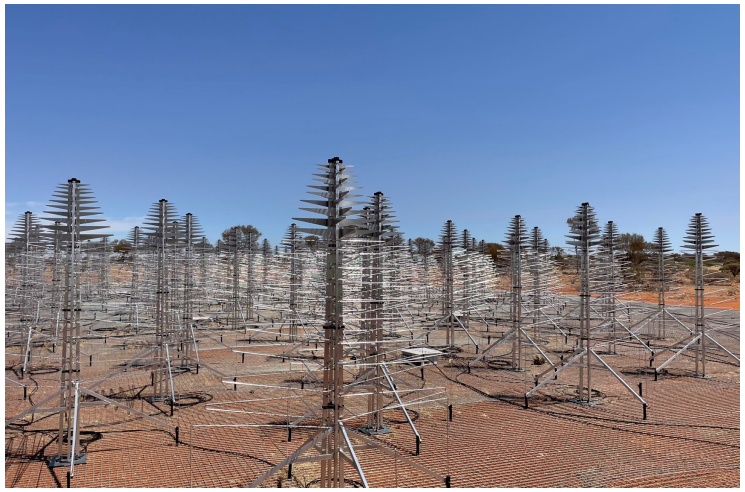
SKAO

Headlines

- The SKAO has completed 24 months of construction activity of a projected seven-year construction phase:
  - Over 56 construction contracts have been awarded for a total commitment of approximately €491M
  - Rapid progress on the ground in South Africa and Australia!
  - To date UK awarded contracts for up to £45M
- UK SKA Regional Centre (SRC) Project underway:
  - UK Regional Centre Prototype by 2025
  - Aim to use pre-cursor data to stress test technical & science pipeline
- Progress with membership (Spain, France, Canada, ..)



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Simons Observatory UK (SO:UK)

Headlines

- Simons Observatory (SO) is a US-led project to construct Cosmic Microwave Background (CMB) telescopes in the Atacama Desert in northern Chile.
- Led by the University of Manchester, the project has been awarded £18.3M via the UKRI Infrastructure Fund for:
  - the construction of two Small Aperture Telescopes
  - deployment of a UK-based Data Centre which will play a leading role in the delivery of the SO data processing pipeline and its application to the SO data
  - delivery of Science-Ready Data Products for the SO project
- STFC is additionally supporting Kinetic Induction Detectors (KIDS) development

The Simons Observatory, credit: Simons Observatory

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Rubin Observatory

Headlines

- System First Light expected October 2024, with survey start ca. 4-7 months later
- From 2015 to 2023, STFC supported the LSST:UK Consortium (Phases A and B)
- 2022 Business Case approved to 2035/36, confirming STFC's commitment to the project
- Projects Peer Review Panel (PPRP) reviewed and recommended support for Phase C activities (end of commissioning and start of operations) to March 2027

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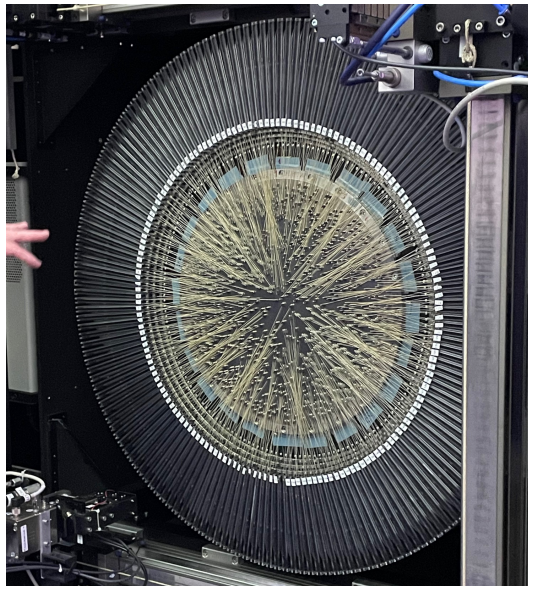
WEAVE Inauguration

Headlines

- WEAVE is the new multi-object survey spectrograph for the ING's William Herchel Telescope at the Observatorio del Roque de los Muchachos (La Palma)
- First light for part of the instrument was reached in December 2022 with the instrument currently going through final stages of commissioning
- Inauguration of WEAVE took place on 30 October 2023 on the island with leaders from the three partner countries of the ING (UK, ES and NL) plus key scientists & engineers from the WEAVE project + the ING team



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Gravitational-wave Optical Transient Observer

Headlines

- The GOTO project consists of multiple wide-field telescopes on a single mount, necessary to map the large source regions on the sky that accompany detections of gravitational waves with LIGO and Virgo
- The construction of the North and South nodes is now complete and the facility was able to commence operations prior to the 4th science run of the LVK (LIGO, Virgo, KAGRA) collaboration in May 2023.

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Summary

Summary and outlook

Positive news

- 18 months into the 3-year spending review settlement
- We are delivering our commitments described in our Strategic Delivery Plan, including:
  - Increase in CG funding
  - Restoration of early-stage R&D funding
- Significant changes to Science Board(s):
  - The role of Science Board (PPAN) is now quite different…
  - Goal is to develop long-term prioritised plans for the whole PPAN programme within a realistic financial plan

Concerns

- Managing impact of inflation and increasing costs of research – tight but OK

Overall

- I believe STFC is in a good place – despite the challenges of the last few years

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Questions?