Dance to the music of space : Research Fortnight : Feb 20 : Paul Crowther

The Hokey Cokey provided the easiest way for me to explain the UK's involvement in the Gemini Observatory to US astronomers at a Spitzer Space Telescope committee meeting in Pasadena last week.

For 15 years, we were "in"; then we were dumped "out" a few weeks ago, after the Science and Technology Facilities Council announced in November that it was plannning to withdraw from the international partnership; now, UK observations at Gemini are back "in" for the next six months; although the UK is currently still "out" in the longer term.

It would be funny, were it not for the numerous PhD theses, young scientists' careers and instrument builders' jobs that are at stake.

The downturn in the US economy suggests lean times ahead, but American astronomers are looking across to unfolding events in the UK with a mixture of bewilderment and sympathy. This is a dramatic turnaround, not least because the UK is widely regarded internationally as second only to the US in astrophysics.

The origin of the crisis affecting fundamental physics has been the widely publicised 'flat cash' settlement for the STFC in the Comprehensive Spending Review for 2008-11 (CSR07), announced in October.

Over at the Engineering and Physical Sciences Research Council, the other research council primarily involved in physics funding, flat cash translates into a modest decrease in the volume of responsive grants that can be funded.

In contrast, flat cash for the STFC has resulted in the threat of large numbers of redundancies at the Rutherford Appleton Laboratory, the Daresbury Laboratory and the Astronomy Technology Centre; breathtakingly quick withdrawals from long-term international projects; plus an unprecedented 25 per cent decrease in the previously planned volume of research grants that aim to exploit the STFC's share of particle accelerators and telescopes over the next three years.

This outcome contradicts the government's recognition of the importance of science to the UK economy and society. Astrophysics and particle physics attract students to the field of physics, a subject that underpins many other disciplines. Indeed, the present Secretary of State for Innovation, Universities and Skills (and soon to include 'Science'), John Denham, has stressed that basic research should not suffer as a result of the drive to achieve a more effective use of research for the UK.

The UK has experienced a 'brain gain' from the increase in basic physics funding over the past decade. But this advance could quickly go into reverse if the UK is not judged to be so attractive for bright young physicists. Reductions in funding, regardless of how they are presented, send a very clear signal to current students: if they want to pursue careers in astronomy or particle physics, they would be best to do so overseas.

More university physics departments may now follow the example of Reading and close as a direct result of these cuts. Even worse, physicists have had to draw the government's attention

to the present crisis through the media. This approach may exact a heavy toll, and turn undergraduates away from physics just as, ironically, the number of applications for undergraduate physics degree programmes are rising, and as the government seeks more students in science, technology, engineering and maths.

The opaqueness in the STFC leadership's decision making has attracted wide criticism, most recently from the Council of the Royal Astronomical Society (see opposite). The STFC advisory structure has failed to engage with the wider communities on setting scientific priorities. The previous research council involved with funding blue skies physics research, the Particle Physics and Astronomy Research Council, had a sufficiently broad advisory structure that it could credibly claim to develop science themes through peer review. At first glance, the STFC advisory structure mimics that of PPARC, but priorities across such a broad spectrum of physics has been heavily reliant on too small a pool of scientists.

All large facilities involved in blue skies research are both international and long-term in nature. And yet STFC administrators decided to withdraw the UK from Gemini, the International Linear Collider and ground-based Solar Terrestrial Physics before the council's own science committees could fully consider the options. Some welcome steps are now being taken to minimise the damage over the UK's ejection from Gemini, and perhaps reverse the decision through dialogue with the US National Science Foundation. Nevertheless, this sequence of events has been damaging both to the UK's research credibility and its reputation as a reliable, long-term partner.

Alarm bells may already be ringing at NASA headquarters over moonLITE, a joint technology-led lunar mission with the UK. Such ventures are intended to provide a stimulus for UK industry, and encourage it to increase research budgets for both science and technology. Unfortunately, the STFC's strategy for balancing the demands of industry, technology and science has not been communicated to the academic community.

In response to the consequences of the STFC's settlement in CSR07, the government set up a review of UK physics research under the chairmanship of Bill Wakeham, vice-chancellor of the University of Southampton. The government now expects a report in the summer, several months earlier than planned. Many physicists hope that Wakeham will consider whether the hybrid structure of the STFC, forged last April from PPARC and the Council for the Central Laboratory of the Research Councils, has led to the current crisis and whether such a structure makes the most effective use of government funding.

In the short term, one way to minimise damage and restore confidence would be for the government to provide the STFC with an extra £25 million to maintain the volume of research grants. It could go a long way in doing so by waiving VAT on running costs at the new Diamond synchrotron, in which the STFC has an 86 per cent stake, and by restoring protection from currency and GDP fluctuations for subscriptions to international facilities. In the longer term, crises might be averted by setting up an independent committee, as the Royal Society told Parliament in December, "to advise the Director General for the Research Councils on the Science Budget".

Although things remain bleak right now, there are some positive developments that might follow from the current crisis. Many scientists have been in touch with their MPs for the very first time, opening up a welcome dialogue. Many astronomers have also recognised that our

community needs to be better organised, and see the American Astronomical Society as a possible role model.

Finally, particle physicists and astronomers need to be more effective at explaining to the wider public how we benefit UK plc, and what would be lost to the UK if a decision was taken to withdraw from funding such esoteric subjects. “That’s what it’s all about!”

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