

PHYSICS COMMUNITY

UK Astronomers Face Tough Decisions on Telescope Closures

Radio astronomers at the UK's Jodrell Bank Observatory are breathing easier now that front-page newspaper reports of closing it have quieted down. In response to public uproar, UK science minister David Sainsbury said in July that there are no plans to close the facility. But the spotlight is still on ground-based astronomy, as the science community waits for news on the near-term science budget next month and debates which facilities to close as a trade-off for joining the European Southern Observatory (ESO) in Chile.

Earlier this year, the Particle Physics and Astronomy Research Council (PPARC), the body that funds UK astronomy, announced the results of a long-term strategy review. The review recommends that the UK's top ground-based priorities be to join ESO; become more involved in the Atacama Large Millimeter Array (ALMA), of which ESO is a partner; fund more basic research into new telescopes and instruments; and increase the number of researchers working in astronomy. "Without these measures," the review says, "UK astronomy will not be able to conduct world-class research."

The way forward

In the past, PPARC's hopes of joining ESO have been dampened by a £65 million (roughly \$98 million) joining fee plus £12 million in annual dues. Instead, PPARC joined smaller international collaborations such as the US-led Gemini twin telescopes. But now UK astronomers are worried that there "could be a lost generation of young astronomers who will be unable to realize their potential" due to a lack of access to 8-meter-class telescopes, says Mike Edmunds, who chaired the PPARC review.

Michael Rowan-Robinson of Imperial College in London agrees: "We have now reached the situation where we cannot build state-of-the-art, cutting edge, ground-based telescopes on our own. The way forward for the UK is to join ESO." Membership in ESO would give the UK 22% of the observing time on the Very Large Telescope, tripling the UK's total access to

To pay for the UK's joining the European Southern Observatory, some of the country's best telescopes will have to be shuttered.

8-meter telescopes. It would also increase the UK's share in ALMA from 5–8% to nearly 11%.

Astronomer Royal Martin Rees of the University of Cambridge believes that strengthening ESO will be good for European science. "Europe, through the European Space Agency, cannot aspire to the overall scale of NASA's program. It is therefore surely in Europe's interest to avoid relegation to second place by exploiting the complementary techniques in ground-based astronomy, especially as ESO has already shown its potential as a 'world beater,'" he says. Or, as someone quipped at a recent Royal Astronomical Society meeting, "ESO's real ambition is to beat the hell out of the Americans in optical astronomy."

Potential pain

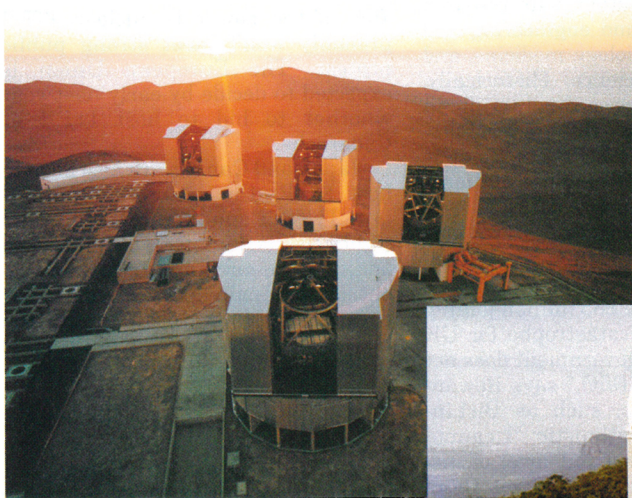
With an annual astronomy budget of £93 million, PPARC doesn't have

enough cash to join ESO. But it wants to, by January 2002. In a recent budget proposal, PPARC asked the UK government for the full ESO joining fee plus £5 million toward the annual contribution. An additional £2 million could be transferred from the current ALMA budget, but even with that, £5 million more would still have to be found. The solution, says Eric Priest of PPARC's astronomy science committee, is to cut funds from other optical, infrared, and millimeter programs such as the James Clerk Maxwell Telescope in Hawaii. The Anglo-Australian Telescope is also threatened with closure but, says Bristol University's Mark Birkinshaw, a member of the panel that runs that telescope, "I feel that the community will want to continue those associations as much as is possible."

Despite the science minister's reassurances, Jodrell Bank's network of radio telescopes is not yet in the clear: A current international review could result in cutbacks in its funding. But it's unlikely to be sacrificed for ESO—astronomers are uneasy about gaining optical and infrared astronomy

at the expense of radio astronomy. "I felt it was premature of PPARC to raise the issue of specific closures," says Rowan-Robinson, "although it was probably sensible to

EUROPEAN SOUTHERN OBSERVATORY



THE EUROPEAN SOUTHERN Observatory's four 8-meter telescopes (above) have long been coveted by UK astronomers. But joining ESO will come at the cost of other facilities—the Anglo-Australian Telescope (right) is one potential victim.



ANGLO-AUSTRALIAN TELESCOPE

point out that joining ESO will certainly impact the current program."

But, says PPARC chief executive Ian Halliday, "I do not believe we would have been taken seriously over ESO without accepting the potential pain. If we do not join ESO but want a big presence in ALMA and eventually OWL, ESO's Overwhelmingly Large telescope, then we will still have to make these cuts."

Further candidates for cutbacks are some of the telescopes in the Isaac Newton group on La Palma in the Canary Islands. The telescopes are jointly run by the UK, the Netherlands, and Spain, all of whom are under financial pressure. However, keeping the telescopes open could also be part of a UK strategy for joining ESO: The telescopes are at a prime site for observing in the northern hemisphere and could become the core of a European Northern Observatory. Larger projects, such as the proposed GranTeCan—twin telescopes similar to the 10-meter US Keck telescopes in Hawaii—or the European Extremely Large Telescope, could then be built at the site. The UK has initiated informal discussions with other countries about this idea as a *quid pro rata* for membership in ESO.

Glimmer of hope

The results of the UK government's recent across-the-board spending review offer a glimmer of hope: By 2004, money for science will increase by 7%. The government is currently deciding how to split the new money among PPARC and the other four research councils, which fund engineering and applied physics, biology, medicine, and environmental science. Historically, PPARC has done exceedingly badly in these competitions. But, notes Rees, the annual cost of ESO membership is only 5% of PPARC's budget and one-fifth of what it pays for CERN.

Still, many astronomers are worried that PPARC will not receive the funds to cover ESO's annual dues—not to mention the £65 million joining fee. "It will be a catastrophe for UK astronomy if the government does not back this bid for ESO," says Rowan-Robinson. Others, such as Birkinshaw, are more optimistic: "I cannot believe that the current level of discussion could happen without there being some assurance that additional funds will be found. There also appears to be willingness, at a high government level, to find funding that wasn't present before." A decision on PPARC's budget is expected in late October.

PAUL GUINNESSY

Fusion Community Cheers European Bid for ITER

France will vie to host the International Thermonuclear Experimental Reactor (ITER), a tokamak intended to test the feasibility of producing fusion energy. The July announcement by the French atomic energy commission was greeted warmly by fusion scientists. With the European Union's approval, the Cadarache nuclear research center, near Aix-en-Provence in southern France, would compete with sites in Canada and Japan to host ITER.

Earlier this year, Europe, Japan, and Russia endorsed plans for a smaller ITER than had been originally envisioned (see PHYSICS TODAY, March, page 65). The partners hope that the project's slashed price tag—halved to less than \$4 billion—combined with strengthened European commitment will up the chances of the facility's actually being built.

A team of European fusion experts is evaluating Cadarache as a site for ITER in terms of technical suitability, safety, social acceptance, costs, and benefits to industry. "It is a well-equipped site," says Jean Jacquinet, director of Cadarache's fusion activities. "It has the necessary power sources and cooling sources, and we have experience managing large projects." And in France, where roughly 75% of the power is nuclear, ITER probably won't meet strong public protest. The European Union is expected to decide by early next year whether to bid to host ITER at Cadarache.

Japan and Canada are also keen to host ITER—the nonprofit organization ITER Canada recently set its sights on Clarington near Toronto. In addition, research and industrial scientists in Spain are lobbying their government to propose a site for the tokamak, which would give it access to European funding earmarked for less developed regions.

The French proposal is timely: Europe's Sixth Framework Programme, a five-year R&D budget that begins in January 2003, is being sketched out now. And, with France currently holding the six-month rotating presidency of the European Union, ITER is likely to get on the agenda. Without a European proposal to host ITER, says Alex Bradshaw, director of the Max Planck Institute



CEA/CADARACHE

THE CADARACHE nuclear research center in southern France might host the International Thermonuclear Experimental Reactor.

for Plasma Physics in Garching, Germany, "support from the European Union might have dwindled." So even if ITER doesn't end up in France, the proposal alone could mean the project gets more European money. It would also increase Europe's political clout when it comes to negotiating a site for ITER.

Indeed, the French proposal is widely seen as a boost for ITER. As ITER Canada's Don Dautovich says, "It addresses a previous weakness—why isn't there a European country willing to host ITER?—and it increases the probability of ITER proceeding through to construction." European fusion scientists like the idea of a site conveniently near home. But the Canadian site is still seen as being the best technically, largely because the radioactive tritium needed for fusion experiments is produced there and wouldn't have to be shipped. It may also be the best location for enticing the US, which withdrew from ITER in 1998, to rejoin. Says Dautovich, "Canada could be a compromise site—it wouldn't be a defeat for either major power"—the European Union or Japan. A site decision is expected by late 2002, with construction to start, at the soonest, in 2003.

TONI FEDER

Journal Cost Studies Again Ruled Fair

In June, the French court of appeals ruled in favor of the American Physical Society (APS), the American Institute of Physics (AIP), and the estate of Heinz Barschall in the latest round