

The best for British superconductivity?

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Eleven British universities are busy finalizing bids to host the first University Research Centre in high-temperature superconductivity. But there are questions to be asked about the establishment of such a Centre, and about the squeezing of further funds for superconductivity from other areas of science.

OVER the past few weeks, many of Britain's high-temperature superconductivity researchers have had to spend more energy on deciding how to respond to the Science and Engineering Research Council's (SERC) latest initiatives than on science. At the end of July, SERC sent out invitations to eleven institutions to bid for the very first University Research Centre (URC) in high-temperature superconductivity, with responses requested by 15 September (see *Nature* 328, 370; 1987). A couple of weeks later, there came the formal announcement of the £2-million that has been set aside by SERC for research grants in superconductivity *outside* the proposed URC.

All this sounds like good news for the British effort in high-temperature superconductivity, which so far has been notable for its quality, but not for its quantity. SERC seems to be doing its best, but there are serious problems. First of all, it seems that neither the money for the URC, nor that for the research grants, is new, but has come from squeezing SERC's already hard-pressed budget even further. This robbing Peter in order to launch Paul goes against the whole spirit of the recent Advisory Board for the Research Councils' (ABRC) discussion document *A strategy for the science base* (see *Nature* 328, 280; 1987), which recommended strongly the establishment of interdisciplinary URCs. They made it clear that, to be effective, the proposed Centres must be adequately resourced, and that that will require substantial *additional* funds.

Research assistants

Secondly, the Centres are each to have 20 to 30 post-doctoral research assistants — where are they to come from? There are simply not the skilled people available who are willing to accept the relatively low pay, and the lack of any kind of career structure. Because of the political significance that has been attached to the URCs, perhaps a way will be found to make these posts more attractive, but then the inevitable result will be that it will become even more difficult than it is now to fill such post-doctoral positions elsewhere.

So, although it is clearly SERC's present intention to have a dual-track approach to high-temperature superconductivity, with one URC now (and

perhaps a second one later), and also a substantial research grant programme spread over several other universities, the limitations on both money and manpower may make this impossible. Grants may be awarded, but if the hands are not available — and it is hands, not big machines, that are needed most urgently — the grants will be useless. Those in other research areas who have had to give up substantial funding will soon be asking for some of their money back. But there will also be ideological pressures. After all, it is being claimed that British university research is too dispersed and on too small a scale to be competitive, and that Centres are the way forward. The politicians may well ask why SERC is trying to maintain both the URC and the research grant approaches, and force a choice. It will not be easy to ditch a URC whose launch has been proclaimed as the answer to our problems.

Will a URC for high-temperature superconductivity actually be useful? The ABRC report identified some of the features it thought warranted a Centre. In its multidisciplinary aspect, high-temperature superconductivity fits the bill to perfection. People who had never before talked scientifically to each other now collaborate closely. Ceramicists, chemists, crystallographers, physicists, electrical engineers are all in it together. It is tempting to construct a Noah's Ark, to recruit a couple of each species and give them the money to get on with the job.

Unfortunately, high-temperature superconductivity, which is still some months away from its first birthday, doesn't work quite like that. When some reasonably convincing physical explanation for the superconducting mechanism is found, it will provide a signpost for the direction of a flood of new work. Again, the techniques for making the materials are still being tried out, and for the technologically important thin films there is no way yet of knowing whether, for example, molecular beam epitaxy or chemical vapour deposition or some other technique will be the most useful. Consequently, specifying now what should be in the high-temperature superconductivity URC is fraught with uncertainty.

What about the senior scientific staff? There are groups of scientists, such as the inorganic chemists, who have just met

superconductivity for the first time in their professional lives, and whose skills are essential for the new materials. Are they going to immediately uproot themselves to move to a new Centre? Over time, and as the subject develops, priorities will change and people move. But it cannot happen overnight.

Strategy

Certainly, British researchers in superconductivity recognize that there has to be an overall strategy, and that interdisciplinary and inter-institutional collaborations are essential. Some degree of concentration of resources is appropriate, but I have yet to hear anybody, academic or industrialist, put a scientific case for focusing efforts at this early stage on a single URC in high-temperature superconductivity. Indeed, the institution that receives it may well be handicapped for months, as it struggles to organize the Centre while others get on with the science.

But there is a positive side to the URC initiative: even if they had not already done so, the process of formulating a bid for a multidisciplinary Centre has forced people together across departmental boundaries. It is perhaps a fair criticism of some institutions that those boundaries are often marked by substantial barriers, not because of any lack of good will, but because it requires conscious effort and precious time to overcome them.

It is clear that many of the eleven institutions that have been asked to bid for the URC in high-temperature superconductivity will be able to put forward a strong and coherent multidisciplinary programme, but there is no one outstanding candidate. Not only that, but university superconductivity groups in Britain, both large and small, have worked together informally over the past few months with great success. Will SERC be able to find a way of exploiting the strong spirit of co-operation that is in the air? Or will it be forced to select a single Centre, with the 'winner' uncertain of whether it is fortunate in having been chosen, the losers perhaps dispirited, and a hiatus for the British contribution to high-temperature superconductivity? □

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