A genuine global partnership?

S. S. Yamamoto

Japan is considering a huge financial investment in the US Superconducting Super Collider. But other types of contribution, to this and any international project, are equally important.

A HIGH-LEVEL delegation from the US Department of Energy recently visited Japan with a letter from President Bush to Prime Minister Kaifu soliciting about $1.6 thousand million for the construction of the Superconducting Super Collider. The request was made in the spirit of the agreement between Bush and Kaifu to form a 'global partnership'. But I have serious doubts as to whether financial support of the Superconducting Super Collider falls into the category of global partnership. Although the United States invite foreign participation where money and manpower are concerned, to the best of my knowledge they do not invite participation on an equal basis in scientific, technical and administrative matters. By definition, a global partnership must involve such participation. If the past record of the US–Japan cooperative programme in high-energy physics is anything to go by, involvement of Japanese scientists will be secondary to the country's financial contribution in the case of the new project.

The US government is not to blame. The problem is Japan's. An impediment to genuine international collaboration is the reluctance on the part of the Japanese government to provide enough money for its physicists who work on collaborative research projects overseas, and the reluctance on the part of Japanese universities and research institutes to let their people, particularly senior people, spend an extended period overseas to participate fully in an experiment. Junior physicists and graduate students, some of whom are on the payroll of US institutions participating in the experiment, must bear the burden of carrying out the work without much guidance or leadership. This is detrimental not only to the education and training but also to the significance of the scientific contribution of Japanese teams.

Wrong priorities

I vividly remember the comments of Professor Robert Wilson, a former director of Fermilab, in his talk on international cooperation in high-energy physics at the 1986 meeting of the Japanese Physical Society in Tokyo. After lauding Japan for its active participation in collaborative experiments in the United States, but without stating whether Japanese physicists had made any significant scientific contributions, he said, "and I particularly welcome your money". This candid statement succinctly reveals the state of many of the US–Japan collaborative experiments then in progress. The situation is not very different now.

Ninety-one Japanese physicists have agreed to participate in the Superconducting Super Collider project, but some of these are from small groups of one or two and not likely to participate in a significant way. I see no prospect for improvement. There are only a few postdoctoral fellowships provided by the Japan Society for the Promotion of Science to send young PhDs to work on international collaborative projects for a certain fixed period without tenured appointments. Therefore, it is likely that only a small fraction of the 91 physicists will be able to work on the project full-time. Under these circumstances, I feel the expenditure of nearly $2 thousand million is actually detrimental to the sound development of high-energy physics as well as other scientific disciplines in Japan for the following reasons.

Japanese physicists will be paying an entrance fee to join the project without really being able to make significant scientific contribution. Under the guise of US–Japan collaboration, some Japanese high-energy physicists have deprived themselves of an opportunity to do their own experiments, and some graduate students have been deprived of opportunities to work closely with their supervisors. In addition, if a sizeable fraction of the rather few university-based high-energy physicists are engaged full-time in the Superconducting Super Collider, how will their graduate students obtain PhDs? How can the domestic high-energy physics programme continue adequately if $1.6 thousand million is spent on the Superconducting Super Collider? To educate and train future physicists, the number of university-based high-energy physicists must be increased, and Japanese high-energy accelerators must remain operational and new machines built. Some Japanese physicists believe that in return for the contribution to the Superconducting Super Collider, all future high-energy accelerator projects in Japan, such as the Japan Linear Collider, should be abandoned, and high-energy physics experiments should be done abroad. Such an arrangement will have untold ill consequences for Japanese high-energy physics.

There is also the question of allocating funds for collaborative research projects in other countries, notably for LEP at CERN. There is already a successful collaboration in a multinational project called OPAL at LEP involving physicists from the University of Tokyo. At present, seven of these are working at CERN for extended periods. Some have been there for many years, and the cost of supporting them is borne by the university from a specially allocated budget. The capital expenditure for this collaboration is limited to the detector cost, but the case of the Superconducting Super Collider may cause CERN to request contributions from Japan to its operating funds. To have more balanced global collaborations, I think some of the money for the Superconducting Super Collider should be spent on this and other future international collaborations.

Political aspects

Finally, because the United States asked for money before adequate discussion among Japanese physicists as to the desirability and extent of their participation, the Superconducting Super Collider case has begun to take on a political aspect. A project of this magnitude is bound to be political to some extent, and of course physicists alone cannot decide the extent of the Japanese contribution. But if political considerations overwhelm the scientific ones, the project will bode ill for future international collaboration.

So should Japan contribute to the Superconducting Super Collider? My answer is a qualified yes — qualified because if the Japanese contribution is to be mostly monetary, my answer is no. But as the project is deemed to have significant scientific merit worthy of an enormous investment by many distinguished physicists around the world, and because there is strong interest in it on the part of some of the Japanese high-energy physics community, my answer has to be yes. The US government and high-energy physics community should insist that the Japanese contribution is scientific as well as financial. Because large-scale international collaborations are inevitable in many fields of basic and applied research, it is imperative that this case should be carefully discussed by physicists and government officials of both countries. □

S. S. Yamamoto is in the Department of Physics, University of Tokyo, Bunkyoku, Tokyo 113, Japan.