Nothing held back in Indian – Soviet scientific collaboration

New Delhi

THE long-term Indo-Soviet science agreement signed last July got off to a start last week with the two countries agreeing to work on 70 specified projects in eight broad areas. In the next two years, the Academy of Sciences of the USSR will throw open 90 of its institutes to 200 visiting Indian scientists who will stay up to 10 months. India will reciprocate. According to the academy president, Guri I. Marchuk, "the USSR has no science programme with any other country in the world on such a large scale".

By involving top scientists in the programme, the Soviet Union is trying to show that it is viewing the collaboration very seriously. "When we say our labs are open to Indians, we will not hold back any secrets", said an academician. To prove this point, the Soviets have agreed to share with India two of its advanced technologies: the manufacture of diamond films for coating materials and the induc-

tion of thermonuclear fusion.

Among the identified projects, half belong to the area of basic science and one-third to product-orientated technologies such as catalysts, superhard materials and special lasers for surgery.

The rest are concerned with futuristic technologies from which both countries will benefit commercially. The cooperation will work at three levels: exchange of scientists, creation of scientific centres jointly manned by experts from both countries, and sharing of information through seminars and symposia.

The Soviet Union will establish a facility in India for the production of oral polio vaccines. The Soviets will also set up a power metallurgy centre in Hyderabad that will broaden research in new materials, and the two countries will exchange information and samples in the area of high-temperature superconductors.

The Soviet Union will help the Bhabha Atomic Research Centre in the design, construction and operation of the proposed synchrotron radiation source at the Centre of Advanced Technology in Indore which has plans to start building a 20-MeV linear accelerator by 1990. The Soviets will also help to set up facilities for making laser glasses and growing shaped crystals, and will assist in making gas lasers for medical applications. India also proposes to buy a continuous-wave carbon-dioxide laser for material processing.

Although India will benefit most from this collaboration, the Soviet scientists are dismayed by the lukewarm response from their Indian counterparts. The reasons for this, presumably, are the language barrier and unfamiliarity with a cold climate.

Another disincentive, according to an Indian participant, is money. Indians sent to the Soviet Union under this agreement will get just 18 roubles a day for short stays or 450 roubles per month for extended stays to support their families. Their living allowance for travel to the West is four times higher.

K.S. Jayaraman

Magnetic appeal

London

A NEW nuclear fusion experiment, designed to test superconducting technology for fusion reactors, has started up in France. The TORE-SUPRA reactor, at the Cadarache Centre near Aix-en-Provence, uses the most powerful superconducting magnets yet tried on a fusion tokamak apparatus.

The large doughnut-shaped reaction vessels of tokamaks conventionally use copper-wound magnets to confine the hot plasmas (about 10^8 K) in which light nuclei fuse and release energy. It is thought, however, that commercial reactors will need superconducting magnets to sustain the high fields for useful durations. TORE-SUPRA, a joint venture of Euratom and the Commissariat à l'Energie Atomique (the French atomic energy commission) costing FF800 million, is a testing bed for the necessary techniques. When it reaches full specification in the next two years, TORE-SUPRA will generate a magnetic field of 45,000 gauss, maintaining a plasma carrying a current of 1.7 million amperes for 30 seconds. These will be the first studies of tokamak operation in the steady or quasi-steady regime.

A similar Soviet experiment, T-15, is still under construction. These and current conventional experiments in Europe (JET), the United States (TFTR) and Japan (JT-15) will provide the basis for the international construction of a prototype commercial fusion reactor, ITER, in the 1990s.

Roland Pease

EEC decision on fusion delayed as Britain cries "too costly"

London & Brussels

THE European Community's proposed £4,000 million, five-year research programme inched further towards realization last week with the provisional or final endorsement of another batch of projects by ministers meeting in Luxembourg. But Britain once again incurred the anger of its fellow members by complaining at the proposed 911 million ECU (European currency unit; 1 ECU=£0.69) budget for the nuclear fusion programme. There is also disagreement about how to reorganize the Community's Joint Research Centre, which is scheduled to receive 700 million ECU until 1991. The ministers are due to meet again in late June to resolve the outstanding issues.

Agreement was reached on some 2,000 million ECU of projects. The only project to win final approval was the 1,600 million ECU second phase of the ESPRIT programme of information technology, now being promoted as the flagship of the Community's joint research endeavour. ESPRIT II will concentrate on micro-electronics, information processing systems and information technology applications, with 'new emphasis' being placed on computer-integrated manufacturing (CIM) and application-specific integrated circuits (ASICs).

Common positions — Community jargon for provisional agreements — were achieved on several other projects. The Science programme to promote interaction within the Community is to receive

167 million ECU. DRIVE and DELTA, offshoots of ESPRIT and its sister telecommunications programme RACE, are concerned with information technology applications for road traffic and distance learning; they will receive 60 million ECU and 20 million ECU, respectively. A common position was also adopted on the revision of the 1985–89 biotechnology programme, supplementing its budget of 55 million ECU with a further 20 million.

The difficulty over the fusion programme has resulted from disagreement about how much of the proposed budget should be held over beyond 1991. This principle of 'overhang' was instituted as the price for Britain's agreement to the overall Framework research programme, agreed in essence last October, after a nine-month delay. The European Commission has proposed a fusion budget of 911 million ECU. For Britain, the overhang is too small — it wants it to be 100 million ECU and has indicated that it is not prepared to shift. At last week's ministerial meeting, a compromise figure of 35 million ECU was put forward, which received the support of 11 of the 12 delegates.

Most of the Community's fusion work is done at the Joint European Torus, at Culham in England, where there is growing despondency at ministers' failure to agree a budget. As things stand, the laboratory is having to work on a reduced budget of a monthly allocation of one-twelfth of last year's spending.

Simon Hadlington & Bernard Conlon