# THE ICTP **TRIL** PROGRAMME

# **T**RAINING AND **R**ESEARCH IN **I**TALIAN **L**ABORATORIES

*"Unless it has its own scientists and technicians, no country can call itself free. This involves the whole problem of scientific and technical training from secondary education to fundamental research…". – René Maheu, UNESCO Director General (1965)*

## 1. Introduction

The INTERNATIONAL CENTRE FOR THEORETICAL PHYSICS (ICTP) in TRIESTE set up in 1983 a fellowship scheme indicated as Programme for TRAINING AND RESEARCH IN ITALIAN LABORATORIES (TRIL). The main motivation was the increasing demand from many Developing Countries scientists to have an advanced experimental counterpart to the theoretical research and lecture-based training offered at the Trieste Centre.[1]

A more farsighted view was to favour, through direct contacts and side-by-side research, the regular development of collaborations between the Italian scientific community and individuals, groups, and institutions in Developing Countries, enlarging substantially the line of action of the ICTP. The main objective remains to strengthen a permanent elite which, being aware of the needs of their own country and cognisant of the frontiers of science and technology, may properly influence the decision-makers' choices.

The specific purpose of the TRIL Programme is to offer scientists from developing countries who have participated in the ICTP scientific activities (conferences, workshops, schools), the opportunity of widening their experience by getting actively involved, in different branches of physical sciences, with the research work of laboratories at Italian universities and at public and private research centres. This includes academic studies as well as practical applications and industrial projects. In general, stays in the laboratory last several months (mostly one year and longer), but shorter visits are also envisaged.

The fields covered, which reflect current activities held at the ICTP, can be broadly classified as [2]:

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[1] For a more complete description of the motivations, achievements, programmes of the Abdus Salam ICTP see "The Constant yet Ever-Changing Abdus Salam International Centre for Theoretical Physics", Juan G. Roederer, Physics Today, v. 54, n. 9, September 2001, pp. 31-36.

[2] Purposely Experimental Particle Physics was not initially considered as a field of primary interest to Developing Countries.

***Physics of Condensed Matter***

***Physics and Energy***

***Physics and Technology***

***Earth and Environmental Sciences***

***Physics of the Living State***

***Miscellaneous*** *(Instrumentation, Topics at the interface with other sciences i.e. Chemistry, Biology, Mathematics)*

Grants in a specific area are announced by a poster which contains a list of the Italian Laboratories agreeable to host scientists from Developing Countries together with a short presentation of the research activity carried out in each of them.

The selection is done jointly with the Italian laboratory indicated by the candidate as a priority in his application and is based mostly on scientific merit and on the matching of the candidate's expertise to the research lines pursued in the laboratory.

## 2. Achievements

The TRIL Programme represents no doubt one of the most successful and fruitful activities of the Centre. Since 1983, in this framework 986 scientists (for a total of 1449 grants and 13,483 person-months) from Developing Countries have been offered many interesting opportunities to participate in side-by-side high level research, mostly experimental, working in active Italian teams with advanced equipment and experiencing an international atmosphere. (see table 1).

**Table 1**

| | |
|---|---|
| **Grants awarded** | **1488** |
| **Grants of less than 3 months** | **384** |
| **Grants of more than 3 months** | **1104** |
| **Fellows** | **1016 *** |
| **Person-months** | **13787** |
| **Laboratories involved** | **339** |
| **Publications submitted** | **2809 **** |
| **Countries involved** | **74** |

*Several fellows were awarded more than one grant. ** Results obtained from the 1406 grants terminated.

It can also be interesting to have a geographical distribution of grants and fellows. This is presented in Tab. 2 which shows the figures relevant to the ten countries which have till now better profited by TRIL.

| Country | Applications | Grants | Fellows |
|---|---|---|---|
| CHINA | 1603 | 278 | 214 |
| INDIA | 1318 | 281 | 189 |
| ARGENTINA | 225 | 97 | 68 |
| NIGERIA | 555 | 72 | 41 |
| BRAZIL | 90 | 43 | 39 |
| CUBA | 143 | 64 | 39 |
| EGYPT | 367 | 40 | 26 |
| TURKEY | 160 | 36 | 24 |
| POLAND | 129 | 30 | 23 |
| ROMANIA | 265 | 41 | 22 |

More than 339 Italian laboratories have till now contributed to TRIL without any charge for the assistance offered to the fellow. Universities are the most numerous host institutions because of their historical ability of dealing with different problems and interesting solutions. On the other hand laboratories of public and private Research Institutions - CNR, ENEA, INFN [1] and several others - often make available equipment specifically suited to a given research and the presence of foreign visitors can be a valid solution to temporary personnel problems. The stay in Italy also represents a rewarding cultural and human experience, even more if the fellow is accompanied by his family members.

As a measure of the success one can mention the often significant contribution offered by the fellow to the research activity of the laboratory, the good standard of the reports published, the fact that frequently a TRIL fellowship , considered a guarantee of academic excellence, has been instrumental for the scientists to progress in his academic carrier (to the rank of Full Professor, Vice Chancellor, High Ministerial Official, even Minister). Another positive aspect is represented by the ever increasing interest and participation of the Italian scientific institutions which continue to offer the possibility of a high level scientific collaboration and often contribute financially to the costs of the grant, sometimes

[1] CNR; National Research Council
ENEA: National Body for Energy and Environment
INFN: National Institute for Nuclear Physics

through specific agreements (in 2002 the financial contribution from those sources constituted more than half of the TRIL budget!).

## 3. Developments

The visit of an individual scientist has in many cases constituted the seed for a more extended collaboration, which sometimes involves the institutions. One can quote the fruitful, almost regular collaboration between Italian Laboratories and corresponding institutions in India, China, Cuba, Argentina, Morocco, Nigeria. This side of the programme, i.e. the " follow-up " stage, represents one of the main objectives of the TRIL and needs continued attention and support. Many return visits have been supported but in order to make the "follow up" action more effective, the creation of a TRIL Associate Scheme was recently advocated. Paralleling the original ICTP-Associate Programme, the TRIL Associates are entitled to pay regular visits to the laboratory of their first stage, 3 visits in 5 years, 2-3 months each time, to complete and update original research projects.

Twenty years later, the above description confirms that the TRIL Programme can be considered a very valuable component of the action of the ICTP (and of the Italian Government) to strengthen a scientific-technological elite in the Developing World, in the broader framework of the relations between the North and the South. A natural development of TRIL is a series of "more", more topics to be included, more fellowships, more collaborations etc. But also more industrialized countries supporting our endeavour: partners from Europe are welcome any time! Will our physicists' community be willing to set up a TREL (E for Europe) Programme?

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