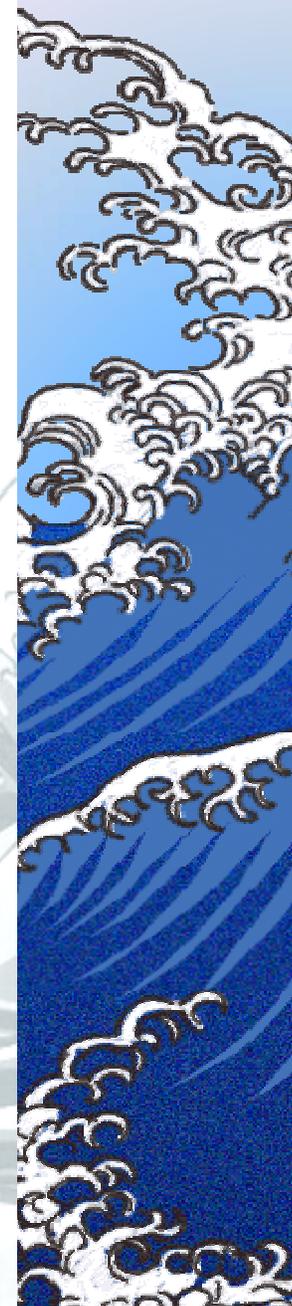




*INFN*

*Funding schemes and  
Research Evaluation*

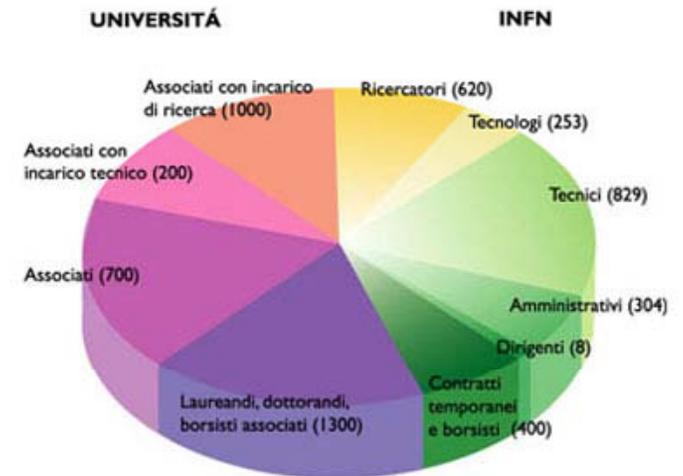




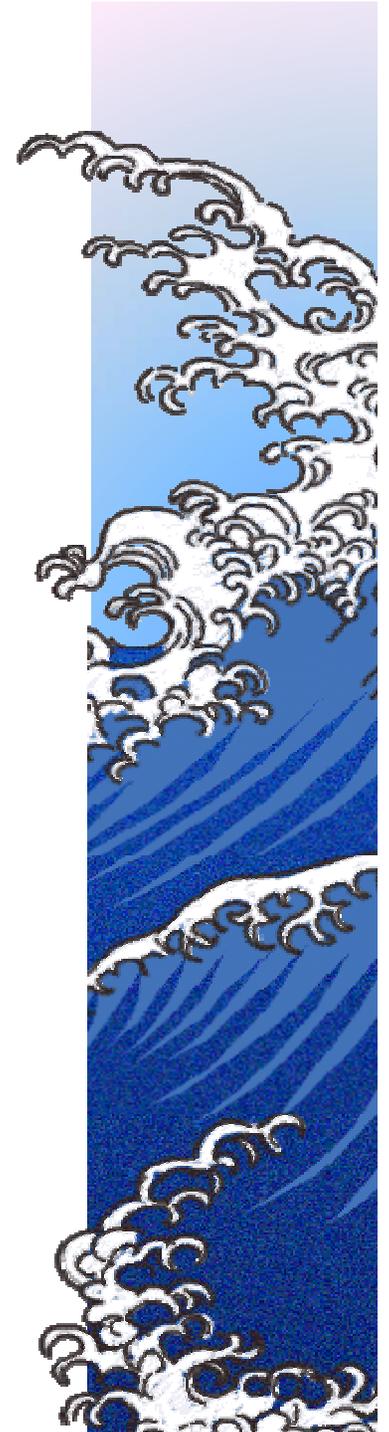
- INFN - the National Institute of Nuclear Physics - is a Research Organization dedicated to the study of the fundamental constituents of matter
- It conducts theoretical and experimental research in the fields of subnuclear, nuclear, and astroparticle physics
- Fundamental research in these areas requires the use of cutting-edge technologies and instrumentation, which the INFN develops both in its own laboratories and in collaboration with the world of industry
- INFN promotes the application of the skills, methods, and experimental techniques to research in other fields, such as medicine, artistic preservation, and environmental protection
- These activities are conducted in close collaboration with the academic world
- Research programmes are very often carried on within international Collaborations and in Laboratories abroad (Europe, USA, Japan)



- ▲ Research activity at the INFN is carried out at two complementary types of facilities
  - The 19 Divisions (Sezioni), each located at a University physics department
  - The 4 National Laboratories
- ▲ The INFN workforce includes about 2000 of its own employees, almost 2000 university employees involved in research conducted by the Institute, and 1300 young researchers
- ▲ The main decisional body of the Institute is the Council of Directors, comprised of the President and the Executive Board, the Directors of the National Laboratories and Divisions and representatives from other institutions
- ▲ This translates into an effective balance between centralized and decentralized management



*Research Programme  
And Funding Schemes*





- ★ Five main research lines are pursued and funded through the corresponding Scientific Committees within the budget allocated by the Executive Board
  - Subnuclear Particle Physics (13 projects, 811 FTE)
  - Astroparticle physics (38 projects, 682 FTE)
  - Nuclear Physics (28 projects, 476 FTE)
  - Theoretical Physics (63 projects, 905 FTE)
  - Technology and Interdisciplinary (107 projects, 572 FTE)
- ★ Each Committee is composed by about 20 members
  - Members are elected by the scientific community in the Divisions and Laboratories and have a 3-years term (renewable once)
- ★ Formally, Committees are consultative of the President and the Executive Board, who may change the proposed funding allocation
- ★ Strategic and common projects are also funded through direct channels by the Executive Board / Council of Directors
  - *e.g.* GRID Computing, New Accelerator Technologies



- ▶ Peer review is at the heart of the whole decision making process, from accepting a new project, monitor it throughout its life and assessing the final outcome
  - *ex-ante*, *in itinere* and *ex-post* evaluations
- ▶ Scientific Committees are responsible for the first two steps and are supported by about 400 referees in their work
  - Referees are nominated by the Chairs of the Committees and are taken from the scientific community, not only national
- ▶ Each Committee convenes about 8 times a year and each project is evaluated *in itinere* about twice every year
  - This allows for a very positive, constructive and transparent interaction between reviewed and reviewers and help the research teams to spot controversial issues as early as possible
  - In the case of long-term and high-profile projects, allows also to understand envelope problems or the need for funds redirection

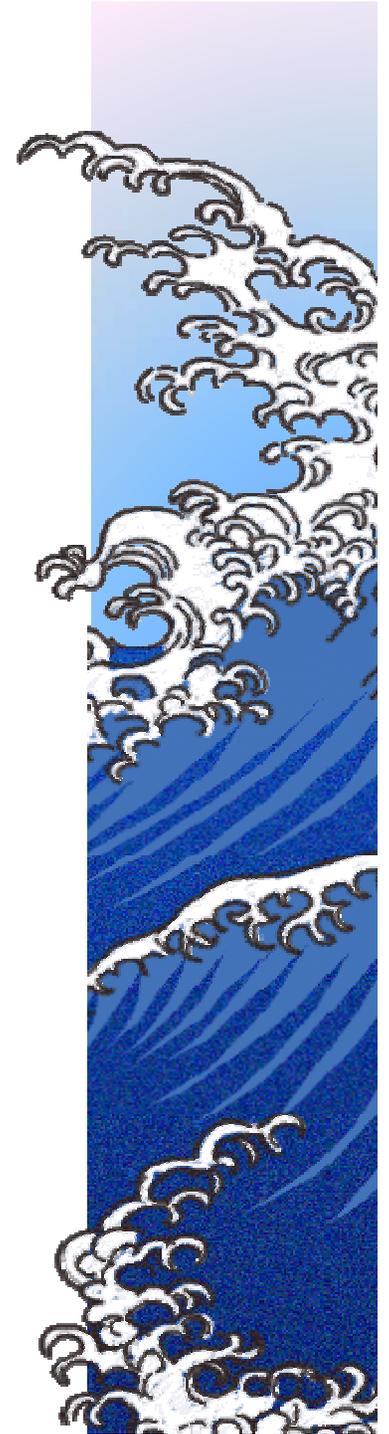


- ▶ Global strategic choices for the Committees are defined with a three-year span
  - ▶ However availability of funds is defined by the Government every year
  - ▶ In the past 6 years we have lost about 15% of the assumed budget
- ▶ Every project is typically funded once per year
  - ▶ The referee advice is also used also to understand whether there are dependencies during the year suggesting to put part of the funding *sub-judice* to the results achieved in the mean time
  - ▶ A milestone-based approach is also used to monitor the evolution of the projects (in particular in the construction phase)
  - ▶ The funding scheme cover all the costs of the research programme presented by the teams
    - ▶ Some of them (like missions abroad) are limited by the Minister
- ▶ Scientific approach to data analysis (which, how, etc) is not directly questioned during these interactions
  - ▶ On the contrary, the natural growth of interest around single researchers' ideas and initiatives is seen as a sign of maturity
  - ▶ Large experiments need some more careful monitoring



- ▲ Human resources are an issue for both the Institute scientific activity and the recruitment of valid reviewers
  - Training of reviewers is a fil rouge also for other Fora...
- ▲ Due to a set of governmental limitations on the employment in the public sector, very few permanent positions have been awarded in the last years and many young researchers are still on temporary solutions
- ▲ Many interactions with the Minister in order to ease this situation
  - Starting from 2008 we expect to have a slightly better landscape
- ▲ Recruitment, even for temporary positions, is now happening only through national competitions, where candidates have to indicate the preferred Division or Laboratory they would like to work in
  - We wish to strive for excellence across the whole country
  - Selection committees are nominated by the Council of Directors
  - The formal procedure of the competition will allow candidates to be eligible for a future permanent position without the need to pass another board
    - ▲ 2 written tests and an interview on scientific activity

# *Evaluation*





- ▲ Evaluating research is a service to both scientists and citizens
- ▲ The evaluation process aims to achieve a comprehensive picture of the outcome of INFN projects, addressing concurrently scientific, socio-economic and inter-disciplinary impacts
  - Scientific performance indicators are mostly based on the publication activity in international journals credited by the Institute for Scientific Information (ISI Thomson)
  - Socio-economic impact is important for a public research Institution to assess the relationship with the Country, in terms of cultural growth and interactions with the industrial world (spin-offs, etc)
  - Inter-disciplinary aspects are embedded in the INFN mission, and measure the spirit of cooperation with other fields, not necessarily related to fundamental research
- ▲ The assessment of this complex interaction is beneficial to achieve a better structure of the Institute activities



- ▲ The Research Evaluation Committee addresses in particular the *ex-post* stage of the process, serving as information gateway for the INFN Executive Board
  - The goal is to provide the Management with factual evidence about performance indicators of the research activities in all the Scientific Committees
  - This in turn may drive modifications to the scientific policy
  - Every year a Report is issued covering the three areas described before
- ▲ To avoid any self-referencing scheme, the outcome of this work is submitted to an International Advisory Board which provides the Evaluation Report on INFN activities
  - Chair is Albrecht Wagner, DESY Director, and membership includes experts from the industrial and financial worlds
  - The Reports are publicly available (<http://www.presid.infn.it/cvi>)

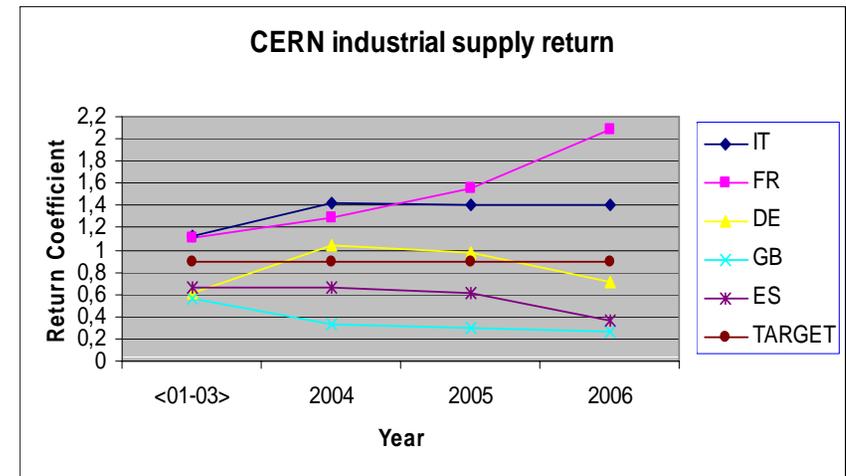


|                | Laurea |      |      |       | Laurea Magistralis |      |      |       | Ph. D. |      |      |       |
|----------------|--------|------|------|-------|--------------------|------|------|-------|--------|------|------|-------|
|                | 2004   | 2005 | 2006 | 04-06 | 2004               | 2005 | 2006 | 04-06 | 2004   | 2005 | 2006 | 04-06 |
| <b>INFN</b>    | 147    | 243  | 257  | 647   | 305                | 371  | 319  | 995   | 158    | 196  | 185  | 539   |
| <b>Physics</b> | 628    | 882  | →    | 2265  | 1097               | 1020 | →    | 3175  | 317    | 396  | →    | 1069  |

- Societal impact is particularly evident in the sector of high-level education
- Training is an intense activity by INFN researchers and associates at all levels of university education (Laurea, Laurea Magistralis, Ph.D.)
- The fraction of Ph.D. is around 50% of the area, a clear indication of the interest raised in the young people by all INFN activities
- From the ratio between Ph.D. and Magistralis stems that about 50% of degree students continue in 2004-2006 with a doctorate (raising wrt previous years)
  - Based on partial data for the others: 25% go to software Informatics sector, 4% to public/administrative, 2% to private sector, 4% to High School teaching
- Training addresses also the shaping of a professional research character
  - Young researchers participate to day-by-day activities in their groups
  - A considerable effort is spent by INFN in organizing national schools for graduate and PhD students, providing financial support, teachers and administrative staff



- The need for advanced instruments, to progress in the investigation of physics, drives the experiments to develop technologies in all relevant fields like detectors, electronics, accelerators and superconductivity
- This fruitful collaboration with High-Tech industries has reached its top in the last few years due to R&D and construction work for the LHC and its detectors
- A benchmark indicator of the capacity of INFN to qualify efficiently the Italian companies is the quote of contracts assigned to them at CERN, compared to some major European countries
- The Italian industrial return (the ratio of the fractional total value of contracts awarded to a country and the fractional contribution of the same country to CERN budget) is well above the target one
- A global quantitative measurement of the economical return, based on a well-known economical model (Leontief) and taking into account the structural interdependency of the economical system, has also been put in place





- Since Y2K we are also moving in a Government framework, which is monitoring the overall performance of the Research Sector through a dedicated Committee (CIVR) to drive also the funding of the public sector
  - The report from our Evaluation Committee is sent to CIVR
- In 2004 the first complete exercise on the evaluation of the national research system was launched, addressing the 2001-2003 period
  - Covering all sectors from medieval history to cosmology
- The result of this evaluation impacts the funding of the Institutions
- The exercise is based on the submission of a set of “Selected Research Products” to be peer-review evaluated
  - The algorithm sets the number to 660 products for INFN (the highest in Italy)
  - Each product is a scientific publication or a technical realization or a design work, accompanied by the corresponding detailed description, and has been evaluated by at least two experts
  - 59% of experts are from Italian Universities, 22% from foreign Institutes, 17% from Research, 2% from Industry
  - For Physics: 1448 experts, 563 (39%) from foreign Institutions



- ★ The attempt to evaluate the full Research system, Universities and Institutes is certainly a titanic work
  - 102 “participants”, 17329 “products”, 6661 “experts”
  - For INFN, the writing of 660 descriptive cards, addressing not only the scientific content, but also implication in other fields, potential sign of innovative development, etc., has been also a titanic work...
- ★ Now the 2004-2006 Evaluation is starting...
- ★ We have sent feedback to the CIVR Committee and the Minister about issues which we feel were not correctly handled
  - e.g. the percentage of authors in a Collaboration: this is representing the level of internationalisation of our field, and is not a sign of weakness
  - The appreciation of resource and finance management could also be made more diversified, including the positive fall-back onto national industry
- ★ The Minister has acknowledged the relevance of these points and for the future an Agency will take care of the global Evaluation of the public research sector, hopefully with differentiations based on the nature of the work done

- ▶ Since 1970 INFN Committees are performing evaluation of research to achieve the best outcome of the funded projects
- ▶ More and more the interplay with other threads of the national and international tissue has come to stage
- ▶ The high-level score of INFN activities in the world is of comfort for the approach taken and is also stimulating new initiatives
- ▶ The human component remains within the highest priorities and concerns

