

Frascati National Laboratory

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1 Introduction

The LNF is the largest (for number of employees) and the first built of the INFN national laboratories. Actually, the INFN was funded, in the fifties of last century, to give Italy its first particle accelerator and the site to locate this infrastructure was chosen to be Frascati. Since these early days, the LNF has always been involved in two main activities: building and operating particle accelerators, designing and constructing particle detectors.

The LNF site stands on a surface of 135.178 m², 25.000 of which are indoor and include offices, laboratories and workshops.

At LNF are hosted the following facilities:

- DAΦNE, an e^+e^- collider operating at the Φ energy (1020 MeV), able to deliver instantaneous luminosities $\sim 2 \times 10^{32} \text{cm}^{-2} \text{s}^{-1}$, a world record at this energy;
- a synchrotron radiation facility (DAΦNE.Light) with lines in the X, UV and infrared regions, extracted in parasitic or dedicated mode, from the intense photon emission of DAΦNE;

- a Beam Test Facility (BTF), with two beam lines providing electron/positron or photon beams mainly for detector calibration purposes;
- SPARC_LAB, a facility that combines a linear accelerator (SPARC) and a ~ 200 TW laser (FLAME). This is an infrastructure for R&D in the field of new technologies for particle acceleration like FEL, PWFA and TeraHertz radiation;
- SCF_LAB, a laboratory equipped for Space Simulation. It characterizes devices that are to be sent in spatial missions;
- DDG-Lab, the infrastructure of the Detector Development Group, that since 1985 has been performing R&D, design and construction of classical and innovative gaseous detectors for large high energy physics experiments;
- COLD (CryOgenic Laboratory for Detectors), the site where research is conducted on superconductors, magnetic materials and related systems using magnetic and electric transport tools with cryogenic equipments able to study the dynamic behaviour of these materials under conditions of extreme temperature and magnetic field;
- NEXT (Nanoscience EXperiments for Technologies), a laboratory that synthesises and studies nanostructured carbon materials;
- assembling halls, mechanical workshops, a Computer Center, and an Electronics Laboratory suited for complex and challenging enterprises in many fields of fundamental research;
- eight clean rooms (class ISO 6 \div 8), three connected to DAFNE_Light, SPARC_LAB and SCF_LAB, and the others equipped for the construction of different kind of particle detectors, for a total area of $\sim 400\text{m}^2$.

Year 2021 started at LNF with a one-day workshop titled “**Fisica Fondamentale a Frascati**”. The meeting has been a brainstorm among theoreticians and experimentalists on the opportunities to continue to carry out at the LNF experimental activities that could contribute to the scientific exploration of fundamental questions in particle physics. This initiative has been triggered by the awareness that while the ongoing DAΦNE scientific program is coming to an end, the EuPRAXIA project, identified as the major future facility of the laboratory, has a time horizon of several years before entering in the operation phase. The workshop has thus been the occasion to see in which fields in fundamental physics the LNF can give a sound contribution within the medium-term by exploiting the existing infrastructures or, in case some breakthrough for some specific research is foreseeable, by implementing minor upgrades. The topics that have been identified are: (i) the quest for dark matter candidates in terms of feebly interacting light particles; (ii) probing the axion solution to the strong CP puzzle by searching for dark matter axions with superconducting cavities and with large volume haloscopes; (iii) the study of the low energy QCD problems related to the role of strangeness in nuclear matter.

The different aspects of these scientific issues and the outcome of the discussion have been summarized in a written report that then has been submitted to the review of the LNF Scientific Committee to have also an external point of view.

2 Organization

The LNF personnel, at the end of 2021, consisted of 302 units of personal, 27 of which have a fixed term contract, plus 227 associate members. Among these, there are university and PhD students, young post-Docs and employees from universities or other research institutions. Associate members

work alongside staff members and likewise take part in the laboratory's activities. Tab. 1 shows the distribution of the LNF personnel among the different profiles.

	Staff	Temp.	Tot.
Researcher	69	0	69
Engineer	66	7	73
Administrative	37	5	42
Technician	105	13	118
Tot.	277	25	302

Table 1: Snapshot of the LNF personnel at Dec. 2021.

Fig. 1 shows the organization chart of the laboratory. The structure consists of services that respond directly to the Director, and three divisions (Research division, Accelerator division and Technical division) that also consist of different services. The laboratory also has a Scientific Committee composed by eminent international scientists that help the Director in shaping the research program. They meet twice a year and deliver recommendations regarding the scientific activities of the laboratory.

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Organizational Chart

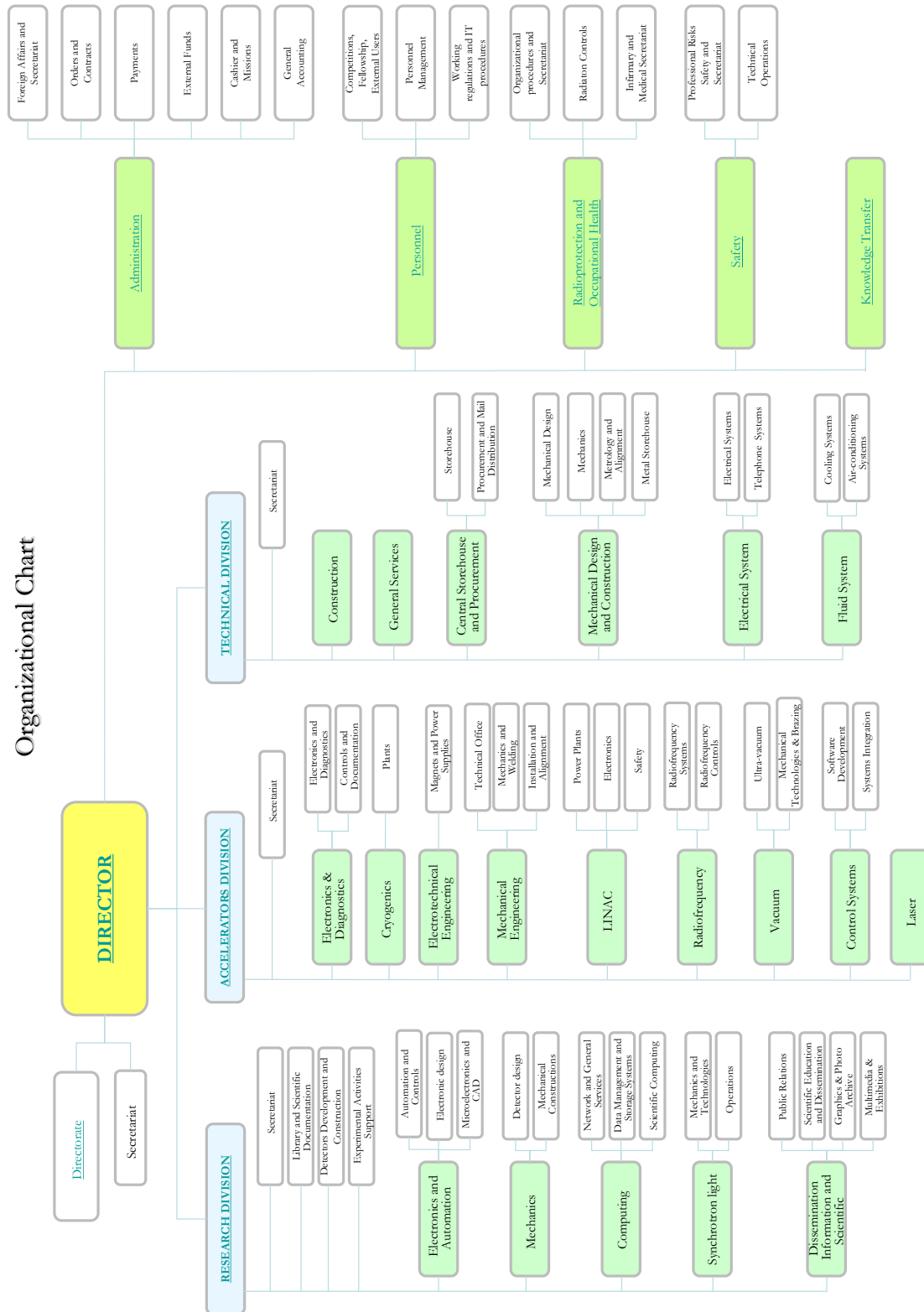


Figure 1: The LNF organization (see text for more details).