48th MEETING OF THE LNF SCIENTIFIC COMMITTEE

The Director and the Chairman thanked J.Rossbach, at his last meeting as member of the SC, and welcomed P.Muggli as new member.

The spring 2014 meeting of the SC was cancelled because of a number of incidents forced to stop the DAPHNE complex for several months. In the last 12 months there was progress on many fronts, including: the completion installation and commissioning at CERN of the NA62 anticoincidence modules; the preparation of LHC upgrades; the signature of the ELInp contract. The BTF complex is fully booked and SPARC_LAB is working fine. LNF started a discussion about its future with a successful "What's next" meeting that was run few days before this meeting.

The main open questions in the schedule of the activities of LNF depend on the performance of DAPHNE. Without stable operation it is difficult to understand which integrated luminosity can be achieved with the upgraded machine, however decisions about the future of DAPHNE, KLOE and

SIDDHARTA cannot be postponed indefinitely. June 2015 is seen as a dead line for taking these decisions.

1. DAΦNE, KLOE and SIDDHARTA

The laboratory made an impressive investment in consolidation, however several external events beyond control of LNF limited to various degrees the operations of the accelerator facilities. DAFNE program suffered the most severe impact, only recently finally recovering from these misfortunes. Other components of LNF research infrastructure recovered quicker. The laboratory is poised to capitalize on the benefits of the substantial consolidation investment in to the accelerator infrastructure.

1.1 DAΦNE

The consolidation program of last year was further extended to fix several potential causes for long period interruptions like the cryogenic system. Basic infrastructure problems resulted in several long shutdowns causing loss of several months of operation time. DAPHNE commissioning demonstrated progress in peak performance, e.g. significant improvement with positron beam. Potential for further operational gains has been identified. What is unclear is the integrated luminosity performance.
The committee notes no positive change in the personnel situation for DAPHNE. While the technical support is adequate, the involvement of the scientific personnel of Accelerator Division is limited. The committee would like to strongly recommend prioritisation of internal resources to support this program in the near term. The main project of the laboratory is facing a difficult situation and it would be normal to move scientific resources to this project from other projects for a limited period of time.

1.2 KLOE

KLOE is ready for data taking, working on the alignment and final commissioning of the new detectors. Once DAPHNE is in a stable situation one should understand which background level is considered acceptable. The goal for the next runs is to collect 5 fb^{-1} to add to the 2 fb^{-1} already collected.

1.3 SIDDHARTA

The physics case for running of SIDDHARTA at DAPHNE will be unique in the next few years, however on the long time scale there may be competition from JPARC. The installation of SIDDHARTA on DAPHNE will take few months without removing the whole KLOE spectrometer, but just the beam pipe

1.4 Recommendations

The committee supports the KLOE and DAPHNE consistent plans for the next 8 months demonstrating the ability to accumulate 1 fb^{-1} integrated luminosity. This milestone should become the main goal of the Laboratory for the next months, sacrificing some other activities for the limited period. Running DAPHNE to specification is also important for the future of lab and its reputation. Not achieving this result may have some impact when defending future requests.

If this milestone is reached, KLOE should continue the data taking. If it is not reached SIDDHARTA should be installed and take data.

2. Research Division Activities

Research Division (RD), the largest of the Laboratory, comprises some 200 members, 50% researchers, 33% technicians, 10% engineers.
The service department units are the backbone of the Division and are under the direct control of director of the DR. They are strong and rich of excellences in several fields. This allowed keeping the level of the research activities of the Laboratory at a high level. Limitations are due to the very high number of activities to be supported and to the risk of losing competencies because of the increasing average age of the staff caused by hiring policies.

The number of different research activities is roughly constant with time around 30 activities. However the indoor research activity has decreased in the last 10 years from 30% to 15% : a factor of two, showing increasing disaffection of LNF researchers towards internal activities. This is possibly linked to the lack of a well-defined research mission for LNF in recent years.

The SC discussed several time the fragmentation of the activities and external and internal balance, the presentation today was very much to the point.

2.1 Recommendations

Prepare for the next meeting a presentation in the closed section to discuss the impact of the various activities [including internal vs external activities summary] on the resources of the Division.

3. Accelerator division activities

Accelerator division activities include DAPHNE, SPARC_LAB, BTF and a number of external activities. BFT is running steadily with more than 250 days of beam time and 30% of foreign users. There is a revival of studies for linac beam energy upgrade and studies for modifications of the infrastructures for future electron experiments with fixed target.
External programs include participations with different responsibilities to ELI-NP, STAR, HL-LHC, FCC and ESRF.

3.1 Recommendations

The committee notes a wide set of externally funded activities bringing in substantial resources (ELI being a prime example). The committee would like to note a very positive aspect of these initiatives that bring in an additional motivation for scientists at LNF, and potentially further extra resources. Can "income" from external projects be made available early to support DAPHNE? The committee would like to see a gain versus cost analysis for external projects presented at the next meeting of the SC.

4. SPARC_Lab

The SPARC_LAB presentation highlighted again the quality of the team and the uniqueness of the facility with first class team with expertise and access to an electron linac, a high power laser, FEL undulators and soon a plasma source. This will enable the team to perform unique and important experiments by combining these resources and also involving ten graduate students recently joining.

The referees are very impressed by the progress and the achievements of the SPARC lab, including : First Thomson scattering signal; First use of THz radiation for solid state physics, motivating the design of a transport line for the THz radiation outside the bunker ; Two-color FEL emission and Two-undulator FEL emission with and without laser seeding. There was also progress in the design of the electron beam line with the possible addition of an x-band cavity to linearize the phase space and improve the comb results. They built and tested a plasma capillary source module for plasma acceleration experiments.
The science done at SPARC_lab is more and more appreciated by the laboratory and by INFN. This resulted in a good funding situation of SPARC_Lab (with an important share on the "premiali") and in support for SPARC_LAB at the top level of the laboratory. However, it is not clear to the committee that this importance leads to adequate and prompt support from the technical staff. In particular progress is often delayed by late allocation of technical resources.

4.1 Recommendations

We support the plan for the next year, which includes Thomson scattering, FEL and THz experiments, as well as progress on the plasma source and beam dynamics. We strongly support the refurbishing of the FLAME laser so that it reaches it design performances (energy and pulse length at the same time).

SPARC_lab would greatly benefit for more technical support. The committee recommends that the priority of and the importance of the work to be done for SPARC_LAB should be made more clear laboratory wide and that AD management sets the priorities in order guarantee a timely response to the technical needs.

The referees encourage the development of SPARC_LAB into an open user facility, with a fraction of the experimental time devoted to users. This would bring human and material resources to the lab. However, this would also require better availability of the facility resulting from stronger technical support.

5. What Next @ LNF

A workshop was held at LNF to discuss the possible future activities in the field of fundamental physics (150 people). There have been proposals for the use of all of the main facilities (DAPHNE, BTF, SPARC_Lab) as well as for the construction of new ones. They include: long term future of DAPHNE as a training ground for machine physics studies, use of the BTF beams for new experiments on hidden gauge bosons and/or light dark matter, SPARC_Lab as a driving laboratory for plasma acceleration in the H2020 program. A report will be written and circulated within INFN before May 2015. The SC will receive a copy and will provide general comments.

6. Personnel

Few positions, requested at the beginning of 2014, are going to be approved soon within the "piano triennale". Two researchers and two engineers should be assigned to LNF. Hiring of technicians and administrators is severely cut and the situation is particularly difficult for LNF because of the age profile and the retirements.

Changes in the management of LNF: F. Bossi is the new director of research U.Rotundo will soon replace C. Sanelli as technical director and T. Ferro will replace in 2015 T. Ghirelli as head of administration.

At the beginning of 2015 INFN will open a search for a new Director of LNF. The opening will be announced publically and the application will be sent to the President who will interview the candidates and produce a short-list. The LNF personnel will give an indication to the management among the short-listed candidates and the Board of Directors will eventually take the final decision. In case of a non-INFN director, a temporary position will be opened.

7. Funding

About 50% of the overall INFN basic budget is for infrastructures and research. In order to keep the present level of the research and infrastructures, the budget is short of some 15% and the "premiali" [addition to the basic budget assigned on excellence criteria] are important to cover this gap. In 2013 INFN got some 30% increase from the "premiali" and this allowed making investments for the future, including

consolidation of LNF. Not clear yet the criteria for assignment of the "premiali" in 2014 and 2015 giving some uncertainties in the budget available for future activities. As guideline for planning, request exceeding some 10 millions over few years should be considered as too large for the current INFN funding level.

8. Next SC meetings

Dates for the next SC meetings: 49th SC 18-19/5/15, 50th SC 26-27/11/15.