39th MEETING OF THE LNF SCIENTIFIC COMMITTEE
FINDINGS AND RECOMMENDATIONS

2. PHOTON SCIENCE

3. DAΦNE AND ITS PHYSICS PROGRAM

4. THE EXTERNAL PROGRAM

INTRODUCTION

The Committee was given a very interesting guided visit to the INFN exposition “Astri e Particelle”, in Rome. The visit took place on Monday 26 October, the exposition’s inaugural day, after the open session. The Committee wishes to thank the organizers for the visit.

The 39th meeting was the last one for Wolfram Weise, who has completed two three-year terms on the LNF SC. The Committee thanks him for his excellent service, and also for helping in finding an expert replacement, Avraham Gal from the Hebrew University of Jerusalem.
Prof. Gal has accepted to serve, and his nomination has been recommended by the Director to INFN management. W. Weise is invited to attend the next meeting, to optimize the transfer of information to A. Gal.

After hearing the Director’s report, the Committee discussed the implications for the LNF experiments of the INFN’s plan to build the high luminosity SuperB flavour factory. It then examined the status of DAΦNE and its experiments, and of the LNF experimental program at the Thomas Jefferson National Accelerator Facility, JLAB.

1. IMPLICATIONS OF THE SUPERB PLANS FOR CURRENT LAB EXPERIMENTS

INFN's plans to build a very high luminosity flavour factory, SuperB, in collaboration with other major laboratories but with the largest funding hopefully coming from the Italian government, are well known. These plans were extensively discussed at LNF in September 2009. Currently, LNF is engaged in a collaborative effort to complete a Technical Design Report by the end of 2010. Funding decisions from the Italian government are expected within the next few months.

It must noted here that recommendations about the SuperB plan are not the task of the LNF Scientific Committee (LNF SC), whose remit is to advise the LNF Director about the laboratory's experiments. Indeed, neither INFN nor the LNF Director asked the LNF SC for advice on this program. However approval of this program would have important consequences on the LNF activities, in general on the programs of the Accelerator Division and in particular on the operation of DAΦNE, of its experiments and on the Photon Science program. Therefore the Committee discussed these consequences in the scenario in which the SuperB program goes ahead.

If SuperB is built at LNF, civil engineering work (digging of the tunnel, etc) will interrupt or end the operation of DAΦNE. In this respect, the Governing Board (Consiglio Direttivo) of INFN committed to supporting KLOE running at DAΦNE throughout 2010, 2011 and 2012. The issue of whether the Accelerator Division's manpower could operate the current collider while fulfilling its tasks for SuperB is more complex and cannot be addressed at this time.

The situation is more complex regarding SPARX, which will be built by a Consortium wherein INFN is one of the 5 members. The division of tasks between INFN and the other agencies is still to be decided, and is likely to be coupled to decisions about SuperB. The short-term future of SPARC, which can be regarded as a predecessor of SPARX and a source of human resources for it, is also not independent of SuperB decisions.

The leader of the Accelerator Division, P. Raimondi, participated in this phase of the SC closed session. He stated that over the next six months there is no conflict on manpower between SuperB and SPARX.

The Committee concluded that there should be no conflict between the KLOE and SuperB programs until the end of 2012, but that it is premature to further address the implications for the Photon Science program.

2. PHOTON SCIENCE

On 26 October, 2009, J. Rossbach met with the FLAME representative L.A. Gizzi and with the SPARC project leader M. Ferrario, and conducted an extensive telephone call with L. Palumbo, the SPARX project director. A number of scientific, technical and management issues related to these projects were covered. The conclusions are as follows:

2.1 SPARC

SPARC has achieved its major milestone in demonstrating lasing in the SASE mode already in February 2009. After the May 2009 meeting of the SC, a number of important further steps were taken:

- FEL gain was significantly increased by orbit improvements. Detailed comparison of observations with theory shows that the process is well understood.
- Observation of 3rd harmonics of FEL radiation. This is normally clear evidence of the approach to the FEL saturation regime.
- Observation of velocity bunching and powerful THz pulses.

- Generation of a sequence of 5 THz pulses separated by less than 1 ps by means of a novel "laser comb" technique.
- Recovery after the earthquake of 6 April.

All of these achievements were appreciated by the committee. The committee also supports the next steps on the agenda, namely FEL seeding at 400, 266 and 160 nm and improving the machine such that FEL saturation can be achieved. For the latter, the electron bunch quality needs to be improved which requires increasing the RF power delivered to the photoinjector resonator. This, in turn, will only be possible after installation of new vacuum pumps. The LNF management is encouraged to provide all support required for continuation of the SPARC program as proposed.

First user experiments based on the powerful THz pulses were reported. This is particularly welcome because it is a beginning in establishing the important interaction between machine and user groups. Setting up in-house FEL user expertise is further encouraged.

An R&D program on timing and synchronization at the fs level is mandatory since it will be indispensable for future pump-probe experiments. The committee is pleased to see that important steps in this ambitious endeavour have been made by successful application of a transverse mode cavity. This indicates that the timing jitter of the electron bunch arrival is below 150 fs r.m.s., which is sufficient to guarantee overlap with the seeding laser beam. The SPARC team is strongly encouraged to move in this direction and it is suggested once more that a dedicated presentation be given during the next committee meeting on generation, control and diagnostics of electron and photon beams at the femtosecond level.

An alarming development has taken place: two experts are leaving the SPARC team, accepting offers by other labs. It is proposed to allocate 2-3 staff positions to the SPARC project. This will not only directly help in keeping key people, but will also give a clear signal to the entire SPARC team that the FEL development is given adequate priority by LNF/INFN management.

2.2 SPARX

The Design Report (3 volumes) as published in 2008 is still valid and is available from the web now. Presently, the major progress on SPARX focuses on the SPARC program. Key recommendations of the Committee on SPARX are as follows:

1. The SPARX team is encouraged to keep on detailing project specs, technical solutions, and the like. Critical components like the photoinjector should be built and tested.

2. SPARC plays a key role in establishing a core team for SPARX. To this end, LNF should help keeping this team together and supply a few staff positions (see remark in the SPARC section).

3. The actual formation of the SPARX consortium is instrumental for progress of the FEL program at LNF and should thus be supported as much as possible.

4. Establishing a strong program to attract PhD students to the accelerator R&D seems possible and could be a key element in building up an experts team for the future LNF project, whatever this will be. It requires, though, an adequate number of staff personnel to be available for supervision of these PhD students.

5. LNF must formulate a clear strategy for its future, since priority decisions are to be made. Based on this strategy, a plan for project organization has to be set up and published.

2.3 FLAME

The objective of FLAME is making extensive use of recent progress in high-power laser technology in combination with advanced accelerator concepts. This has relevance far beyond the immediate FLAME project definition because joining laser and accelerator R&D work is a key element of world-wide accelerator development efforts. It is needed whenever bunch structures on the micrometer scale are to be known. The committee thus welcomes the FLAME project and strategy. Priorities are:

1. Laser-Plasma acceleration
2. Compton backscattering towards a compact X-ray source.

FLAME is a 7-8 M€ project entirely funded by INFN. Presently, it involves some 6 FTE, most of them tightly integrated into the SPARC team. This is very appropriate and welcomed. However the committee feels FLAME is understaffed, considering its ambitious program. It would need 1-2 additional staff positions to guarantee progress and continuity.

For the next open SC session, it is strongly recommended to have a talk about femtosecond timing aspects. In fact, this was already recommended at the time of the last meeting. This talk will be even more useful if it takes into account the different levels of Photon Science expertise within the Committee.

3. DAΦNE AND ITS PHYSICS PROGRAM

3.1 DAΦNE OPERATIONS

Following the clear and comprehensive presentation in the open session, J.M. Jowett met with several members of the Accelerator Division to discuss DAΦNE performance since the last meeting, and the preparation of the forthcoming KLOE run. The findings are as follows.

As recommended at the previous meeting, systematic data on the attribution of collider down-time are now being systematically compiled. These are useful to both the Committee and laboratory management.

The refereed publication on the success of the crab-waist collision scheme, recommended at the last meeting, has yet to appear. However the referee saw a draft and trusts that this will be submitted very shortly.

Performance for SIDDHARTA

The integrated luminosity accumulated to the end of July was somewhat degraded due to various factors which were more or less anticipated at the previous meeting. Cooling system problems due to the high summer temperatures and the need for long overdue maintenance on the linac were frequent causes of downtime. There was a significant improvement in hardware reliability thanks to the maintenance that took place during the summer shutdown. This included maintenance of the linac power supplies, cooling system and replacement of an electron injection kicker feed-through.

The collider restarted on 9 September. Despite some initial problems with the positron longitudinal feedback, data-taking with SIDDHARTA resumed on 22 September. Because of the sharing of kickers between injection and feedback roles, one pulser occasionally misfires causing the loss of half the positron beam. Peak luminosity has not increased in recent months and is still obtained with highly asymmetric beam currents: about 2.1 A of electrons against 1.1 A of positrons, limited by electron cloud effects. Injection of positron current is indeed a major performance limitation, not only in the sense that the current is limited by electron cloud but also, as previously noted, because SIDDHARTA cannot take data during the time it takes to inject beams. During injection of the positron beam, the electrons are at their maximum current but decaying with the short Touschek lifetime, which leads to a significant loss of logged luminosity.

DAΦNE's luminosity production has been excellent in the last month. Delivered integrated luminosity has been close to 10 pb^{-1}/day on average and SIDDHARTA has acquired it with an efficiency of 52%. There is good agreement between the luminosity monitors of the collider and the experiment. The

downtime statistics clearly show that this is thanks to improved reliability of the experiment and the collider (now that summer and the maintenance shutdown are over). The requested 200 pb^{-1} on deuterium should be comfortably in hand by the end of the run on 9 November.
The weak-strong simulations of the beam-beam interaction that were used to predict the luminosity performance up to now were deficient in that the force of the strong beam was represented by the traditional Bassetti-Erskine formula which does not take into account the modification of the charge distribution by the crab-waist scheme. This has recently been corrected. The predictions for optimum beam parameters have not changed much, except that there seems to be a small additional margin for increase of the crab sextupole strengths before dynamic aperture limits set in.

On this occasion, the culmination of the first phase of operation of the DAΦNE luminosity upgrade, the Committee would like to explicitly recognise the important contributions to its success made by other laboratories contributing staff and resources as part of the DAΦNE commissioning team centred at LNF, notably BINP, CERN, KEK, LAL-Orsay, SLAC, and other INFN institutes and universities in Italy.

Preparation of DAΦNE for the KLOE run

In the coming months, DAΦNE will once again undergo numerous modifications and upgrades to prepare for a new run with the KLOE detector. Some of the changes are related to the rebuild of the interaction region to accommodate a magnetic detector while others are intended to improve performance and efficiency.

- The new interaction region, including the new beam pipe, additional skew quadrupoles, compensating solenoids, permanent magnets to adjust the trajectory, etc., is progressing well. All design work and some hardware components are complete while others are in construction. The schedule appears well synchronised with that of the detector.
  The new design has the quadrupoles positioned in a complete assembly in advance, eliminating the risk of rotation errors in installation. Fine-tuning of the betatron coupling will be achieved by excitation of the skew-quadrupoles, eliminating the need for mechanical rotation in situ. A useful flexibility in the value of KLOE's magnetic field has been gained by splitting the permanent dipole magnets used to compensate the vertical beam orbit, removing our previous concern on this point.
- The long-planned modification of the wigglers' poles should reduce the unwanted octupole fields, increase the beam lifetime (crucial for performance, as noted above), reduce the power bill and make the machine easier to handle. However the wigglers are a major component of the magnetic structure of DAΦNE and there is always a risk that such a profound change may not be completely innocuous when it comes to re-commissioning the machine.
- Stripline clearing electrodes are being installed in the dipole and wiggler chambers in order to combat the electron cloud effect. While their impedances have been computed in advance, there is some risk that they will couple to beam power spectral lines and may, in the worst case, have to be removed. They are already expected to get quite hot (80-100°C). Forthcoming laboratory measurements should clarify this. It is also difficult to insert them in the small gap of the wiggler chambers and, for this reason, they will only cover a bit more than half the length of these chambers. Therefore some electron cloud effect will remain.
- Other measures being taken against electron cloud are the doubling of the horizontal feedback power and a new, more effective, horizontal kicker. These are particularly welcome since electron cloud degrades the vertical beam size and lifetime as well as limiting the positron beam current. Finally, a new simulation program has been set up; this incorporates a more detailed model of the ring optics and should provide better predictions.
- Removal of the last of the older generation of vacuum bellows and ion clearing electrodes in the electron ring should also be beneficial for beam dynamics and vacuum.
- Rising radiation levels around DAΦNE require new shielding measures for the collider building. The addition of a beam dump based on a new kicker (such a system was lacking up till now) is

welcome in this regard. It will also provide better protection for the experiment in case of hardware failures or high backgrounds.
- Further maintenance and refurbishment of the linac is also very welcome; we note (see remarks at the 37th meeting) that a stock of new cathodes has been found within the lab.

These (and other) improvements of the accelerator complex are well focused on the points most likely to yield useful increases of integrated luminosity. Taken together, they constitute a very appropriate application of the laboratory's resources to maximising the physics yield of a few more years' operation of DAΦNE.

The perspective presented, of a new phase of DAΦNE operation with peak luminosity of about 5.5×10^{32} $cm^{-2}s^{-1}$, monthly integrated luminosity of 0.5 fb^{-1} and further important reductions in electricity consumption seems within reach. The estimated 3 months commissioning time also appears reasonable. However, as we have suggested in our comments above, this is an upgrade of overall complexity comparable to the one that took place before the SIDDHARTA run. It should not be under-estimated and will require a systematic plan, patiently applied, and the full focus of the Accelerator Division.

Unfortunately, the long-term staffing problems of the Accelerator Division are more severe than ever. There is an urgent need to preserve the outstanding expertise and experience of the present staff by training new accelerator specialists, perhaps via Ph.D. theses, and to offer them attractive career prospects afterwards.

3.2 KLOE UPGRADE AND PREPARATIONS FOR KLOE-2 ROLL-IN

The KLOE referees (T. Akesson, G. D'Ambrosio, M. Cavalli-Sforza) met with the KLOE team on 26 October. The conclusions are as follows.

KLOE will roll into DAΦNE after the SIDDHARTA run ends in the beginning of November. The end of the run this year has not much flexibility since DAΦNE maintenance work has been contracted to start with outside companies at the beginning of November.

The roll-in and commissioning of KLOE will take until March, at which time data taking will start. The KLOE program consists of two phases: Step 0 and Step 1.

Step 0 is KLOE when DAΦNE restarts next year, and is essentially the original KLOE experiment plus two gamma taggers: the High Energy Tagger, HET, and the Low Energy Tagger, LET. In addition the DAQ and data processing get the necessary improvements.

Step 1 has in addition three new detector systems: an Inner Tracker, a forward calorimeter CCALT and a calorimeter around the new quadrupoles QCALT.

Step 0

The original KLOE is on track to move in. A critical item, the new beam pipe provided by the accelerator team, is on schedule. The Drift Chamber and the Electro Magnetic Calorimeter have been tested and cosmic data have been taken. The DAQ and data processing have been upgraded and a new data storage system is ready to be purchased.

The LET inside KLOE is based on 45 LYSO (Cerium-doped Lutetium Yttrium OrthoSilicate) crystals read by Si PMs. 27 crystals are here and the rest is expected in November. The main issue will be to decide if the front-end electronics should be mounted on the detectors or if cables will take the SiPM signals to a location that is more accessible. Everything indicates that it will be the latter.

The HET, 11 metres from the IP, is based on small scintillators that are moved inside the beam pipe. Each HET detector has two staircase-arranged sets of 15 scintillators with dimensions of a couple of millimetres, and two longer scintillators for coincidence. The mechanical components that provide space for the HET to be moved inside the beam pipe are designed but not yet built. The principles for the HET detector elements have been verified. The detector will need readout boards to be constructed. Many steps remain for the HET to be ready in March.

Step 1

The QCALT around the new quadrupoles are tile calorimeters read out by WLS fibres with 2400 channels. They are there to detect photons from K^0_L and charged kaons decaying in the Drift Chamber. The functioning of this type of detector has been verified with a prototype.

The CCALT is a crystal calorimeter close to the IR to improve the detection of low-angle photons. A prototype was built and tested, with good results. More design on geometry, electronics and supports remains to be done. There will be 2 × 24 crystals.

The Inner Tracker is a GEM-base detector inside the DC to improve the K^0_S reconstruction and detection efficiency. It will have five layers. The R&D is concluded with positive results. A TDR has been written and reviewed. Funding for the construction tooling and one layer has been provided.

While most of the construction of the Step 1 detectors would be ready mid 2011, the complete detector will be ready by the end of 2011 according to their schedule.

Some of the upgrade funding for Step 1 is conditioned on the combined performance of DAΦNE with KLOE. This performance will most likely be demonstrated during the first half of next year.

The possible interference between DAΦNE /KLOE running and a possible Super-B project should not be there before 2014, as stated in Section 1 of this document. Nevertheless, the time available for Step 1 KLOE-2 running is severely constrained by completion of the upgrade at the end of 2011 and what will come beyond DAΦNE. Any delay would reduce this time window. There is some urgency in the construction of the upgrade instrumentation.

The Committee enquired whether the expected funding rate to KLOE – depending partially on the performance of DAΦNE – could threaten the timely completion of the upgrade. The Committee was assured by the INFN CSN1 chair that this is not the case. However it will be worth following the DAΦNE/KLOE performance in the months leading to the next SC meeting.

3.3 KLOE DATA ANALYSIS

The KLOE people must be congratulated once more for their strenuous efforts to complete the physics analysis, even in this transition period. New results on kaon physics and hadronic physics at the Φ peak and off-peak were presented at this meeting.

An accurate fit to the proper time distribution of $K_S \rightarrow \pi^+\pi^-$ has allowed a preliminary determination of the K_S lifetime: $\tau_S = (89.56 \pm 0.03 \text{ stat} \pm 0.07 \text{ syst})$ ps, with errors comparable to the PDG value of (89.59 ±0.04) ps. In addition, a more precise determination of the K_L lifetime is required in order to improve the determination of V_{us}: this has been achieved by a very careful analysis of the systematic error along with increased statistics. Crucial to this purpose has been the improvements of the K_L “photon” vertex reconstruction from $K_L \rightarrow \pi^o\pi^o\pi^o$.

Taking advantage of the large kaon sample, the branching ratios for $K_S \rightarrow 3\pi^o$ and $K^+ \rightarrow \pi^+\pi^+\pi^-$ (γ) are under investigation and should allow competitive measurements, improving the present experimental status.

The interplay between the chiral anomaly and vector meson dominance has been studied in $\eta \rightarrow \pi^+\pi^-\gamma$ decays: the aim is to obtain a 1% accuracy in the branching ratio. The analysis of the whole data sample has led also to the observation of 413 events of the type $\eta \rightarrow e^+e^-e^+e^-$, a final state observed for the first time.

The η production in in $e^+e^- \rightarrow e^+e^- \gamma\gamma \rightarrow e^+e^- \eta$ has been studied to determine the width of $\eta \rightarrow \gamma\gamma$ and should give interesting and competitive results. In principle with more statistics even the η form factor for photon production could be studied, which would be relevant for the light-by-light scattering hadronic contribution to $(g\text{-}2)_\mu$.

A possible scalar σ with a mass of 600 MeV, decaying into $\pi^o\pi^o$, has been searched for in the cross section $e^+e^- \rightarrow e^+e^- \pi^o\pi^o$: an excess of 4000 events over the known background is observed.

The apparent discrepancy between the measured $(g\text{-}2)_\mu$ and the SM prediction relies on the experimental determination of the hadronic contribution (a_μ) related to the cross section $e^+e^- \rightarrow$ hadrons. KLOE, by measuring this cross section with a radiative photon at large angle (LA) or small angle (SA), gives an important input to this analysis. A paper is now in preparation regarding the LA analysis after the publication of SA analysis: this elucidates also the region close to the $\pi^+\pi^-$ threshold. The LA final result for a_μ is consistent with SA and thus decreases the KLOE error on this contribution, reinforcing the disagreement of the BNL result with the SM.

3.4 SIDDHARTA

The following section documents the discussions and exchanges of the referees (W. Weise, F. Linde, J. Zinn-Justin) with the SIDDHARTA group during the 39th LNF SC meeting.

After the last SC meeting in May, SIDDHARTA still had to go through a period of low efficiency data taking, continuously monitored in close contact with SC members. From 31 May until the summer break on August 4, a total of 153 pb^{-1} on hydrogen had been logged by the experiment. The situation became significantly better after the summer shutdown, following further important improvements on DAΦNE. As a consequence, SIDDHARTA was then able to take 148 pb^{-1} in just one month (20 September – 22 October). Assuming that these conditions will continue to be realized until the final run on 9 November, the kaonic hydrogen experiment will approach the approved 400 pb^{-1} data set.

During the summer shutdown several further technical improvements were implemented by the group: installment of a new collimator; additional shielding around target and beam pipe; new trigger scintillator for the kaon trigger; replacement of electronics. These steps resulted in an enhancement of about a factor 1.5 of the signal-to-background ratio and an increase of the kaon capture rate of about 15-20%. Preliminary kaonic hydrogen data were presented, based on the limited data set. It is expected that the total amount of SIDDHARTA data will represent a significant improvement in quality over the previous DEAR data from 2002, and that questions about still existing inconsistencies in the previous results will be resolved.

The highly successful kaonic ^{4}He measurement (the first precision data ever taken with a helium gas target) has been documented in two publications, one of which is already in print in Physics Letters B.

Test runs with a deuterium target were aimed at exploring the feasibility of a systematic study of kaonic deuterium. These runs were conducted in accordance with a recommendation of the SC suggesting that further decisions on kaonic deuterium measurements would depend on the outcome of this exploratory investigation. Based on 130 pb^{-1}, this test has so far been unsuccessful: no clear signal has been seen. The deuterium data scanning has nevertheless been useful for the background analysis in extracting the kaonic hydrogen spectrum. In view of the very limited time remaining until the end of the running period

(November 9), it was proposed not to pursue the deuterium runs beyond the approved 200 pb^{-1} , considering the rather small likelihood of obtaining significant results in the available time. The SIDDHARTA group is encouraged to extract a lower limit for the kaonic deuterium width on the basis of the existing data, if possible.

A promising alternative option was discussed, namely to run with a ^{3}He gas target for about 20 pb^{-1}. Given the experience with the previous ^{4}He measurement, it is expected that even such a short ^{3}He run would already yield relevant results. This would be a pioneering measurement, the first of its kind, coming ahead of a corresponding dedicated experiment at J-PARC.

In summary, the recommended agenda for the remaining SIDDHARTA period was
● Kaonic hydrogen: endeavour to reach the programmed 400 $pb^{-1}$with highest priority by end of the run (November 9).
● Kaonic deuterium: do not pursue beyond 200 pb^{-1}.
● Kaonic ^{3}He: consider a pioneering and timely measurement at a level of 20 pb^{-1}.

The SC requests that a status report on the data analysis be presented at the next SC meeting, focussing on the kaonic hydrogen level shift and width and its comparison with previous data.

3.5 AMADEUS

AMADEUS was not asked to give a presentation in the open session, however the AMADEUS referees (F. Linde, L. Fayard) met with the experimental team on 26 October and reported to the Committee as follows.

In the field of deeply bound kaonic nuclear (DBKN) states, the AMADEUS experiment offers unique potential in comparison to existing experiments like FINUDA, DISTO and OBELIX:
1. AMADEUS allows full reconstruction of the formation an the decay of the DBKN state;
2. AMADEUS allows to investigate the DBKN is a clean environment because the lightest nuclei are used as target material and because the K^- is virtually at rest during the formation process; and
3. the required acceptance corrections for the AMADEUS measurements are small.

Even though the main justification for the AMADEUS experiment is to clarify the DBKN state issue, AMADEUS offers interesting measurements of properties of Λ and Σ baryons as shown by the promising results already obtained from a study of existing KLOE drift chamber data as well as measurements of kaon-nucleus cross section measurements for various nuclei.

AMADEUS plans to use the KLOE-2 detector “as is”, but replacing the KLOE-2 beam pipe by a carbon beam pipe surrounded by dedicated kaon trigger counters and a cylindrical cryogenic gas target cell. The design of this beam pipe, kaon trigger and target cell are well underway and are not expected to become time critical.

Regarding the operation of the detector, already more than a year ago several members of the AMADEUS collaboration began to contribute to various aspects of the KLOE detector (trigger, DAQ, gas system, detector control, monitoring, calorimeter and tracking), in order to gain experience in taking data with KLOE-2.

A first Memorandum of Understanding between the AMADEUS and KLOE collaborations was agreed upon earlier this year. The next step required is to make an inventory of the implications of an AMADEUS data taking period on running times, dates, costs and manpower, in view of the unavoidable help needed to operate the KLOE-2 detector while AMADEUS gathers its data. The AMADEUS collaboration would like this to take place in 2011, between the step 0 and step 1 phases of KLOE-2. The AMADEUS request is for an integrated luminosity of 3-4 fb^{-1}.

If the SuperB program goes ahead DAΦNE operation will be limited in time, and this may severely constrain the scenario of operating both KLOE and AMADEUS. The Committee recommends that the AMADEUS and KLOE collaborations put forward the implications of an AMADEUS data taking period in the two scenarios with and without a SuperB program. This would be the minimal information that the Scientific Committee should have in order to make a proper recommendation, and should be provided by the next meeting of the Committee.

3.6 FINUDA

The Scientific Committee appreciated the excellent presentation in the Open Session of the results on hypernuclear spectroscopy, hypernuclear decays and K^- absorption on a few nucleons. The committee also appreciated the important contributions presented by FINUDA at the 10th International Conference on Hypernuclear and Strange Particle Physics, which took place in Japan in September 2009.

The Committee understands that a full-fledged review paper, as augured at the last meeting, may be further in the future. In order to better assess the progress of the analysis, the Committee asks the FINUDA Collaboration for a compilation of the results (presented to conferences, or already published) preceded by a short introduction to put these results in the perspective of the overall FINUDA analysis effort. The Committee would like to receive such a report well in time for the next meeting.

4. THE EXTERNAL PROGRAM

4.1 JLAB

The main programme of Jefferson Lab is the study of the nucleon structure. In this respect, the facility at Jefferson Laboratory, with its very high luminosity and the availability of polarization, is unique in the world. It is a modern laboratory with a very lively scientific atmosphere, very positive for the training of students and young postdocs, enabling them do good physics in collaborations of moderate size.

There is no doubt that from the continuing 6 GeV and the future 12 GeV program a better understanding of the nucleon structure will emerge. However, this physics is complex and the question arises of whether the large set of data being generated has enough theoretical support for their interpretation. (However it should be said that the situation should improve when passing from 6 to 12 GeV). It should also be noted that part of the community does not expect striking physics breakthroughs from this line of research.

Beyond physics issues, before recommending a continuing involvement of LNF with Jefferson Lab a more detailed understanding of the mode of operation of the LNF team and its contributions is needed.

To fully benefit from collaboration at JLAB, it is necessary for the Frascati team to be quite visible and reasonably focused. The presentation in the Open Session of Oct. 2009 was mainly devoted to advertising GPD's and TMD's but gave no real clue on the visibility and involvement of the Frascati team, except that the size of the team seems reasonable and the team seems to work mainly in Hall B. A future presentation should clarify these matters.