Summary of Recommendations
29th LNF Scientific Committee Meeting (November 2004)

KLOE

The KLOE referees were very pleased by the steady increase of luminosity delivered by DAΦNE to KLOE which, at the end of the data period extending into 2005, should reach the goal of a total integrated luminosity of ~2 fb-1. A possibility to shorten the bunch length working with a negative momentum compaction factor should allow a further improvement in luminosity of ~50 % and should be tried as soon as possible. Other ideas to increase the luminosity seem to give marginal improvements and the referees noted the crucial importance of steady conditions to insure minimization of systematics in the reconstruction efficiency.

The strategy of KLOE to extract V_{us} appears very promising as this experiment can combine precise data from K_S, K_L and $K^{\pm}$, allowing excellent cross-checks. It is worth pointing out that the issue of a possible deviation of the CKM matrix from unitarity is not yet closed given the need to use a consistent determination of form factors and life-times which KLOE is able to achieve.

The measurement of the hadronic component of the anomalous magnetic moment of the muon requires an increased effort to control systematics from theory and experiment since KLOE provides by far the smallest statistical error on the cross section below the ϕ. The first step of the analysis is now completed and will be published, but one looks forward to substantial improvements with a new analysis using radiation at large angle and better understanding of the systematics.

The committee was pleased with the renewed efforts in the understanding of scalar meson resonances and with the studies of η decays, topics where KLOE has the unique potential to clarify several open outstanding issues. KLOE has presented an impressive and well thought-out program, well tailored to the current luminosity goals. We look forward to the completion of the ongoing analyses, and to the first analyses of the ϕ->KKγ and η->γ(*)γ* final states from a high luminosity sample.

Publications are progressing well and we hope that the present effort can be maintained. In particular, we think that the kaon data, which provide in several instances the best precisions, should be published before the end of 2005, on time for next PDG release.

KLOE needs to position itself with respect to the proposed upgrades of DAΦNE, in particular a scenario with an 'adiabatic' modification of the machine which would improve the luminosity by an order of magnitude, an essential choice for the future of Frascati.

We look forward for a successful run of KLOE in 2005 with outstanding physics results.

FINUDA

After the report of FINUDA in the open session, the referees had an extensive discussion with members of the collaboration, which led to clarifications of several important issues.

1) The translation of stopped K^- counts into capture rates is directly obtained from simultaneously tagging the K^+.
2) The alignment of the vertex detector with respect to the straw tube detector was obtained using cosmics at zero magnetic field. For the drift chamber positions it was done with the magnetic field on.
3) Two improvements of the energy resolution are foreseen: better determination of the space-time relation for the drift chambers and further on-line fine-tuning of the detector alignment.
4) The new TOFINO subdetector will be ready in March 2005. This will improve the timing properties considerably, making measurements of hyper-nuclear life-times possible.

It appears that the data taken so far are dominated by statistics. Improvements on the Monte Carlo simulations are foreseen, which are important in order to control systematic uncertainties. The results on ^{12}C shown in the report represent approximately half of the presently available data.

The physics program of the experiment was discussed in detail with members of the group. Priority for the immediate future is given to spectroscopy and decays of light and medium-heavy hypernuclei. A novel important topic initiated by a recent KEK experiment is the quest for strongly bound K^- nuclear states. It is realized that the FINUDA detector setup is well prepared to contribute substantially to this issue.

The committee looks forward to an updated report of the physics output and future plans to be presented at the next meeting.

SIDDHARTA

The committee was impressed by the progress on the design and construction of the SIDDHARTA detector:

1. A 30 mm^2 prototype S(ilicon) D(rift) D(etector) was extensively tested at Frascati and shown to have excellent resolution (139 eV, FWHM) and good timing properties. The cutting of the first wafers (at Munich) will be done by the end of January 2005.
2. SDD mounting on high-purity ceramic supports and electrical bonding are being performed by the Vienna group using dummy chips. Cryogenic and bonding tests are to proceed soon.
3. The design of the detector and target set-up is practically ready; it is based on the successful DEAR lay-out.
4. The timing of the kaon trigger will be improved by using PM-tubes with much better timing characteristics, to compensate for the reduced target distance.
5. Trigger tests with a 7 x 5 mm^2 SDD at the Frascati Beam Test Facility with synchronous and asynchronous backgrounds showed a large suppression of the background, except for the beam-related (synchronous) contribution.

6. The electronics design (Milano group) has advanced well. In particular the use of a SDD-JFET system in the charge preamplifier that minimizes count-rate dependent gain shifts. This involves among others a feedback capacitance of 10 fF! Also a power supply with extreme stability has been designed.
7. The road map for the implementation of the SIDDHARTA experiment (end of 2006) appears to have ample redundancy. It is observed that so far the 2004 schedule has been kept.

There is no doubt that the group will succeed in building their detector with the appropriate specifications and within time schedule.

The physics program of SIDDARTHA will focus, in its first round, on kaonic hydrogen and deuterium. New standards of precision for the K^--p scattering length were set by DEAR and they already have a significant impact on the theory of low-energy kaon-nucleon interactions. Reaching an even higher level of accuracy with SIDDARTHA and establishing the isospin dependence of the KN scattering lengths by investigating the K^--nuclear system is a further important step.