LAL - Laboratoire de l'accélérateur Linéaire

Rapport Hcéres

agence d'évaluation de la recherche
et de l'enseignement supérieur

Section des Unités de recherche

Evaluation report

Research unit :

Laboratoire de l'Accélérateur Linéaire

(LAL) – UMR 8607

University of Paris 11

January 2009

agence d'évaluation de la recherche
et de l'enseignement supérieur

Section des Unités de recherche

Evaluation report

Research unit :

Laboratoire de l'Accélérateur Linéaire

(LAL) – UMR 8607

University of Paris 11

Le Président de l'AERES	Section des unités de recherche
	Le Directeur
Jean-François Dhainaut	**Pierre Glorieux**

january 2009

Evaluation report

The research unit :

Name of the research unit : **Laboratoire de l'Accélérateur Linéaire**

Requested label : **Unité Mixte de Recherche**

N° in case of renewal : **8607**

Head of the research unit : **Mr Guy WORMSER**

University or school:

University of Paris 11

Other institutions and research organization:

CNRS

Date(s) of the visit :

November 18th - 19th of 2008

Members of the visiting committee

Chairman of the committee :

Mr Albrecht WAGNER (Desy Hamburg)

Other committee members :

Mr Luigi DI LELLA (CERN Genève)

Mr Jean Marc FILHOL (Synchrotron SOLEIL)

Mr Philippe FARTHOUAT (CERN Genève)

Mr Joël FELTESSE (CEA Saclay)

CNU, CoNRS, CSS INSERM, (représentant INRA, INRIA, IRD…) representatives :

Mrs Suzan GASCON-SHOTKIN (CNU) University of Lyon

Mr Eric PLAGNOL (CoNRS) University of Paris 7

Observers

AERES scientific representative:

Mr Jean Michel ROBBE

University or school representative:

Mrs Anita BERSELLINI- PICARD, Présidente de l'Université Paris 11

Research organization representative (s) :

Mr Michel SPIRO, Directeur de l'IN2P3

Mrs Barbara ERAZMUS, DSA CNRS IN2P3

1 • Short presentation of the research unit

- Numbers of lab members including researchers with teaching duties and full time researchers (62 plus 8 emeritus), engineers (91), PhD and students (38), technicians and administrative assistants (122)
- Numbers of HDR (34) and of HDR who are PhD students avisors (21)
- Numbers of PhD students who have obtained their PhD during the past 4 years (18)
- Average length of a PhD (33 months)
- Numbers of PhD students currently present in the research unit (25); Numbers of PhD students with fellowships (25)
- Numbers of lab members who have been granted a PEDR (6)
- Numbers of "publishing" lab members : 61, 8 emeritus and 14 engineers are also publishing members

2 • Preparation and execution of the visit

The Comité d'évaluation du LAL on 18-19 November has reviewed the activities of LAL. After a short welcome and presentation by the Director of the laboratory, the Committee met with the head of IN2P3, and the President of the University Paris 11. Then it listened to oral presentations about the various research activities carried out by the laboratory: Particle physics, Astroparticle physics and Cosmology, in house accelerators work, Engineering and technical services, Technology Platforms, Instrumentation, and Valorisation.

The Committee also met with the PhD students and the 'conseil de laboratoire' where it discussed with representatives of the various technical areas different aspects of the working life of the lab. The Committee held a closed session dedicated to the preparation of the evaluation report based on the Committee findings.

The meeting was declared closed at 18:00.

All material presented to the Committee was of excellent quality and so was the organization of the day: the atmosphere was optimal in order to allow the Committee to work with maximum effectiveness. Nevertheless, the Committee would have profited from more time for internal discussions and discussions with the management and speakers.

3 • Overall appreciation of the activity of the research unit, of its links with local, national and international partners

LAL Orsay is worldwide known and visible through its outstanding competences in particle physics, cosmology, particle accelerators and associated instrumentation. With about 350 staff and students it is by far the largest particle physics and cosmology laboratory within IN2P3. The programs address many of the leading questions in particle physics, cosmology and astrophysics which are closely connected. The programs are well matched with the outstanding scientific opportunities presented by e.g. the start of the LHC and the launch of Planck. LAL fulfils the role of a National Laboratory.

Particle Physics

This is by far the largest activity of LAL (57 % of FTEs physicists and technical staff).

H1 and D0: The experiment H1 is in the exploitation phase with prolific scientific production. In spite its late arrival to the D0 experiment at the Tevatron, LAL has a strong presence and high visibility both in the latest development of the hardware and in the physics analysis.

LHC: The accelerator will provide access to the exploration of the energy frontier at the TeV scale. LAL has made very visible contributions to the design and construction of the ATLAS experiment. LAL is in a leading position to exploit the scientific harvest. The Committee concurs that the first priority is to fully exploit the physics of the LHC.

Flavour physics: LAL has made a major contribution to the Babar experiment at SLAC which has completed a highly successful program on CP violation studies and flavour physics. The results obtained in this field over the last years have been instrumental for the 2008 Nobel Prize in Physics. The program finds its continuation at the LHC in the experiment LHCb. The laboratory should be vigilant to fully transfer the deep expertise in the B-physics from BaBar to LHCb. LAL has been active in the preparation of a Super B-factory.

Future Energy Frontier: The anticipated luminosity upgrade of the LHC will constitute an extremely challenging environment for the tracking detectors. The Committee recommends a continued strong effort on R&D for the LHC upgrade. LAL plays an important role in the global effort around the International Linear Collider project (machine and detector) which has to be pursued in the coming years. The committee recommends that LAL gets enough support to become a central player in this R&D.

Neutrinos: LAL has been the leading laboratory in the series of NEMO experiments since their first design. The NEMO3 experiment aims at detecting double beta decay in a variety of isotopes with the goal of determining the CP properties of the neutrino and of measuring its mass.

Astroparticle Physics and Cosmology

The program in astroparticle physics and cosmology ranges from the study of the highest energy cosmic rays and the search for gravitational waves ('violent universe') to a detailed analysis of the early universe and the understanding of the Dark Energy (18 % of FTEs physicists and technical staff).

Virgo: This gravitational wave antenna has nearly reached its design sensitivity and will be systematically upgraded in the search for possible sources of gravitational waves. For the Advanced Virgo project the group at LAL has developed the CALVA platform in order to significantly contribute to the evolution of the detector while maintaining its leadership in the data analysis of gravitational wave bursts.

Auger: This detector has recently been completed and provided first evidence for cosmic ray astronomy and a measurement of the energy spectrum of very high energy cosmic rays with unprecedented accuracy. Auger will continue to study the origin of the highest energy cosmic rays. The LAL group has played a major role in the development of the detector and should exploit the expected data fully, while looking towards the future with either Auger North and/or JEM-EUSO.

Planck: The satellite studies the cosmic microwave background (CMB). The group continues to make solid contributions at all levels and is positioning itself for significant contributions to the physics analysis. In order to maintain the group's leadership role it should seek to add one or more postdoctoral researchers.

Dark Energy: The Dark Energy group was formed with the goal of constraining the equation of state of dark energy by the determination of the geometrical structure of the universe. The R&D projects make use of the proven technical expertise at LAL. However, the small size of the group remains a concern.

In house accelerator work

Competence in accelerators has been always a trademark of the laboratory. LAL has two internationally recognized fields of expertise, the Fabry-Perot optical cavities enabling efficient electron beam/laser interaction and RF couplers for superconducting accelerators. LAL has resumed its activity in the development of high brilliance electron guns. This new strategy in the accelerator field had very beneficial effects on the motivation of the staff and on the external visibility of the lab (15 % of FTEs physicists and technical staff).

Engineering and technical services, Technology Platforms, Instrumentation, and Valorisation

The engineering capabilities of LAL are recognized and highly appreciated worldwide. The quality of the work provided by these services was underlined in all the experimental and accelerator presentations. However, a continuing reduction of staff in technical services is putting at risk the capabilities of LAL to conduct their projects. It is necessary to keep some technical expertise in all fields of competence. LAL is maintaining a number of first rate technology platforms for the benefit of the community at large. LAL has created a dedicated group in charge of detector R&D and of support to experimental groups (2 % of FTEs physicists and technical staff) and has a small, very efficient team for valorisation.

4 • Specific appreciation team by team and/or project by project

1. Particle Physics

Present energy frontier

H1

The H1 group is small, but has high visibility. The experiment is in the exploitation phase with prolific scientific production. The committee is pleased that the group concentrates its efforts on QCD fits and the determination of Parton Density Distributions (PDFs) which are a central input to future measurements at LHC. The transfer of expertise to ATLAS has been well prepared.

D0

In spite of its late arrival to the D0 experiment at the Tevatron, LAL has a strong presence and high visibility both in the latest development of the hardware and in the physics analysis. The Tevatron is for the moment the energy frontier machine with a large discovery potential. The running of D0 will continue through 2010 and the analysis of the data for at least a couple of years more. The experience gained in the analysis of the data (electrons from W decays and Light Higgs searches) will be invaluable in extracting physics results from ATLAS where a large fraction of the group is already present. The Committee is pleased that LAL, in a joint effort with three IN2P3 laboratories, has been successful in getting support from the ANR for the Higgs-TeV project. This funding will contribute to exploiting the discovery potential at the Tevatron in financing post-doc positions during the transition from Tevatron to LHC.

ATLAS

LAL has made major contributions to the electromagnetic calorimeter both in the design phase and in the construction which are praised worldwide. LAL has taken large ATLAS-wide responsibilities on commissioning and calibration of the calorimeter. LAL has made important contributions to the software and has played a central role in setting up a Tier2 centre in the Paris area which is fully operational. Three main themes of physics analysis have been identified: Standard model, Higgs to photons and electrons and supersymmetry. This represents a strong and balanced physics program. LAL physicists have taken important responsibilities in physics coordination.

The Committee concurs with the management that the first priority is to fully exploit the physics of the LHC. This is reflected in the fact that since the last review the size of the ATLAS group has grown significantly. LAL is ideally placed for playing a leading role in the exploitation and data analysis of ATLAS, building on the important contribution to the hardware and well prepared analysis projects.

Physics of heavy flavours

BaBar

LAL has made major contributions to the equipment and to the physics analysis of the BaBar experiment at SLAC. The very high visibility has been reinforced recently by the election of a LAL physicist as spokesperson. The chosen physics is at the cutting edge of our knowledge in CP violation. The analyses are quite complex. The reinforcement by a recently created group of phenomenology should make the LAL contribution even stronger. Data taking has ended in April 2008. Transition to other experiments has been prepared. However, it is somewhat striking that one only physicist from Babar has joined the LHCb experiment at CERN which is the new experiment in the important domain of CP violation. The laboratory should be vigilant to fully transfer the profound expertise of the BaBar team to the LHCb experiment.

LHCb

The LAL group has made important contributions to the electronics and the hardware trigger of the calorimeter. The group is at present strongly involved in commissioning, calibration and alignment of the detector, tasks which are a good preparation for the physics analysis. A physicist of the LHCb-LAL group has a leading role in running the detector. The group impact will be reinforced by the recently created theory group. However, the committee expresses some concern about the comparatively modest size of the analysis effort which LAL has so far devoted to optimize the scientific payoff of an important hardware investment.

SuperB

The BaBar experiment has looked for effects sensitive to New Physics at the electroweak scale. A B-factory with hundred times more luminosity would look for effects sensitive to New Physics at the few TeV scale. A design of a super B-factory based on an ingenious crab waist concept has been proposed in Italy. The concept has recently been tested successfully at DAFNE in Frascati. The Committee is pleased that LAL, building on its long invaluable expertise in B physics and electron accelerators, has been very active and has taken important responsibilities in studying the physics case, the machine and the detector for the Conceptual Design Report and that it will continue for the Technical Design Report.

The future energy frontier

SLHC

The anticipated luminosity upgrade of the LHC, the Super LHC (SLHC), will constitute an extremely challenging radiation environment for vertexing and tracking detectors. No present technology can withstand the particle flux. Building on its outstanding expertise in microelectronics LAL, in a collaborative effort with French and international research centres, has undertaken a very ambitious program of R&D. The time schedule is rather short. LAL is best positioned to play an important role. The Committee recommends a continued strong effort on R&D for the LHC upgrade.

ILC

LAL plays an important role in the global effort around the International Linear Collider project (machine and detector) which has to be pursued in the coming years. The effort on physics studies is rising. The detector R&D is well focused on an ambitious sampling calorimeter, with silicon wafers forming the sensitive detectors (SiW Ecal). The committee recommends that LAL gets enough support to become a central player in R&D and construction of a SiW Ecal calorimeter for the ILC.

Nom de l'équipe : Particle Physics

Note de l'équipe	Qualité scientifique et production	Rayonnement et attractivité, intégration dans l'environnement	Stratégie, gouvernance et vie du laboratoire	Appréciation du projet
A+	A+	A+	A+	A

2. Neutrino Program

A LAL group took part in the initial phase of the OPERA experiment and successfully accomplished the task of building and delivering the two focusing horns for the CERN to Gran Sasso beam line. However, the participation in OPERA has been terminated following the retirement of two senior physicists which reduced drastically the group strength.

The laboratory is presently involved in two activities:

1) An **R&D project** (PMm^2) to integrate a matrix of 4 x 4 12" diameter PMT's into a single large-area photosensitive device, with the goal of reducing the cost of future large-mass neutrino detectors based on water Čerenkov or scintillation counters. This relatively small project could be very useful for the third-generation neutrino and proton decay experiments foreseen to start near the middle of the next decade. If this is indeed the case, it is hoped that the LAL neutrino group will be strengthened in order to have an impact also on physics analysis.

2) The **search for double beta decay** ($\beta\beta0\nu$) with the NEMO3 experiment in the Modane underground laboratory. LAL has been the leading laboratory in the series of NEMO experiments since their first design in 1989. NEMO3 aims at detecting double beta decay in a variety of isotopes by observing the two electron tracks in drift chambers and measuring their momenta in a magnetic field. The experiment has already detected the conventional $e^- e^- \overline{\nu}\overline{\nu}$ decay of several isotopes, and has established limits for the $\beta\beta0\nu$ decay of Mo^{100} and Se^{82} which are competitive with the results of other experiments. NEMO3 will finish data taking at the end of 2011, and will reach a sensitivity of 0.3 – 0.7 eV for the ν_e mass. The group must be commended for the success of NEMO3.

The group is also involved in R&D work in view of continuing the search for $\beta\beta0\nu$ decays with a sensitivity improved by a factor of ~50, using 100 kg of enriched Se^{82} (SuperNEMO). If this goal is achieved, the experiment becomes sensitive to ν_e mass values as low as 0.04 eV, and thus has the potential of discovering $\beta\beta0\nu$ decays in the inverted mass hierarchy. This would be a major physics discovery.

Nom de l'équipe : Astroparticles

Note de l'équipe	Qualité scientifique et production	Rayonnement et attractivité, intégration dans l'environnement	Stratégie, gouvernance et vie du laboratoire	Appréciation du projet
A+	A+	A+	A+	A+

3. Cosmology

LAL has two research groups working in the area of observational cosmology.

Planck

The group, involved in the collaboration since 1997, studies the cosmic microwave background (CMB). It continues to make solid contributions at all levels and is positioning itself for significant contributions to the physics analysis, as the mission launch date (foreseen for April 2009) approaches.

In particular, since the 2005 External Review, the LAL Planck group, in addition to its important responsibilities for the bolometric High-Frequency Instrument hardware and software has taken on new leading responsibilities:

- The design and implementation of a new type of far-infrared source for the calibration, enabling the discovery of an unexpected slow time-response component;
- Significant involvement in the preparation for data analysis, most notably in the areas of the extraction of cosmological constraints on neutrino masses. This will be done via the study of distortions of the cosmic microwave background induced by large structures with gravitational lensing.

In order to maintain the group's leadership role it should seek to add one or more postdoctoral researchers. The availability of data and the group size should lead to an increase in the number of doctoral thesis students. Concerning future plans, care should be taken to match new involvements with available manpower.

Dark Energy

The Dark Energy group was formed in 2006, with the goal of constraining the equation of state of dark energy by the determination of the geometrical structure of the universe by surveys of type Ia supernovae, galactic clusters and baryonic acoustical oscillations [BAO]. The group has launched parallel R&D efforts on two survey projects, both of which are foreseen to begin operations by 2016:

- The Large Synoptic Survey Telescope (LSST). The LAL Dark Energy group has taken responsibility for components for the 3.2 Gpixel camera.
- The BAO radio project is aiming at a 3D map of the distribution of atomic hydrogen. The LAL group has taken responsibility for the design and fabrication of important electronic readout and data acquisition components.

The R&D projects make use of the proven technical expertise at LAL, and benefit from collaborations with neighbouring French particle physics laboratories (APC, LPNHE, CEA-IRFU). However, the small size of the group remains a concern. The group should seek to add personnel at the postdoctoral level. Concerning data management for the LSST mission, the LAL group should help to resolve the strategy at an early stage.

Nom de l'équipe : Cosmology

Note de l'équipe	Qualité scientifique et production	Rayonnement et attractivité, intégration dans l'environnement	Stratégie, gouvernance et vie du laboratoire	Appréciation du projet
A+	A+	A+	Non noté	A+

4. The violent Universe

The "violent universe" is studied at LAL along two lines of research: The detection of **gravitational waves** (GW) with the Franco-Italian detector Virgo, near Pisa, and the study of **Ultra High Energy Cosmic Rays** (UHECR) using the Auger detector in Argentina.

Virgo

The *Virgo* detector has achieved its sensitivity goal over most of the frequency range except at the lowest frequencies, where progress is being made. The collaboration is involved in the Virgo+ upgrade (gain of 2 in sensitivity in 2009) and will invest in the Advanced Virgo modification (gain of 10 in sensitivity in 2015), which will almost guarantee the detection of gravitational waves. Virgo will continue its joint measurements with the LIGO collaboration. For the Advanced Virgo project the group at LAL has, supported by EGO and IN2P3, developed the CALVA platform, which will allow to improve the "locking" procedure. In this way this group will continue to contribute very significantly to the evolution of the detector while maintaining its leadership in the data analysis of GW bursts. However, the group has limited strength and has expressed its inability to follow up on the ongoing effort concerning the definition of the future "Einstein Telescope" (~ 2020).

Auger

The *Auger* detector has achieved the complete deployment of its 1600 ground stations and 4x6 fluorescence detectors. The results obtained so far are already very significant: The flux spectrum has confirmed a "GZK-like" behaviour and the highest energy cosmic rays appear to have a non-isotropic angular distribution. Astronomy using UHECR appears to be within reach. However the exact interpretation of these features depends on a proper knowledge of the nature of the primary cosmic ray. The LAL group has played a major role in the development of the detector and has focused on the importance of identifying the primary using both the fluorescence and the ground stations, leading to a key role in this area. The LAL group participates strongly in the analysis of hadronic interactions at the very highest energies where a departure from the expected trend is possible. Concerning the future of its activities, the LAL group is considering disengaging from the Auger collaboration within 4-5 years and is looking at the potential of the space mission JEM-EUSO. Although this mission should be considered very seriously, it appears somewhat premature to consider disengagement at the very moment when Auger South is completed. The Committee recommends strongly that such options be carefully studied.

Clearly both groups make significant contributions to their projects, at the hardware and software/analysis level. It will be necessary for LAL and for these groups to define their development plans for the coming decade.

Nom de l'équipe : The Violent Universe

Note de l'équipe	Qualité scientifique et production	Rayonnement et attractivité, intégration dans l'environnement	Stratégie, gouvernance et vie du laboratoire	Appréciation du projet
A+	A+	A	A+	A

5. Evaluation of the accelerator related activities

Concerning accelerator technology LAL has two internationally recognized fields of expertise:

- The design and optimisation of Fabry-Perot optical cavities enabling efficient electron beam/laser interaction. This was initially developed for generating positrons (CLIC, ILC), and is now also considered for the production of X-Rays. Following the achievement of an unprecedented gain, a patent was taken. The use of this know how is cleverly being enlarged to other projects such as compact X-ray sources (ThomX) which could have interesting applications in both medicine and physics (the Louvre museum is looking for such a compact X-ray source). However financing of such projects and associated R&D remains to be found.
- Construction, processing and conditioning of RF couplers for superconducting cryomodule (Tesla type). Following the TESLA collaboration, LAL is now in charge of the procurement, conditioning and testing of the 800 couplers for European XFEL (as part of the French in-kind contribution). LAL is also working to further reduce the construction costs and performances of the RF couplers in view of the ILC needs (TiN coating).

Besides these two major activities, LAL has resumed its activity in the conception and development of high brilliance electron guns, that it used to have some years ago. The recently installed PHIL gun test bench will enable good progress on R&D and at the same time "hands-on experiments" for the LAL team composed of quite young staff. LAL is also working on the optimisation of the collision conditions on future machines (crab waist tests on DAPHNE and ATF2).

Following the retirement of experienced staff, the accelerator LAL team lacks expertise or competence on certain aspects (diagnostics, power electronics, RF transmitters). This is compensated quite efficiently by proactive actions of the LAL direction to set up collaborations with various labs in France and abroad.

One subject of concern deals with the lack of skills in the infrastructure tasks, such as water, electricity, which for example has slowed down the construction of PHIL. It is recommended that IN2P3 manages to make the LAL autonomous on these tasks.

In conclusion, the new orientations and strategy set up by the LAL directorate in the accelerator field have had very beneficial effects on the motivation of the staff and on the external visibility of the lab. The strengthening of accelerator activities is well in line with similar actions taken in other European countries.

Nom de l'équipe : Accelerators

Note de l'équipe	Qualité scientifique et production	Rayonnement et attractivité, intégration dans l'environnement	Stratégie, gouvernance et vie du laboratoire	Appréciation du projet
A+	A+	A+	A+	A+

6. Engineering and technical services

There was no formal presentation dedicated to the technical services because of the illness of the responsible staff member. However, the amount and the quality of work provided by these services were underlined in all the experimental and accelerator presentations. In addition, the development of PHIL was used as an example of achievement of these services.

The electronics service is composed of 51 staff members, out of which 26 are engineers. It delivers ASICs for the experiments as well as complete readout systems. It has shown its capability of producing, testing and commissioning large systems (e.g. front-end boards for ATLAS or LHCb) and of maintaining them for a large period of time. The latter requires maintaining large test equipments and the presence of enough electronics technicians and "assistants ingénieurs" with long term contracts. The current balance between the number of engineers and of technical staff should be maintained. This service is internationally very well known, as attested by the number of presentations in international conferences and of publications in peer reviewed journals. In addition large responsibilities in experiments are given to members of this service.

The development of PHIL was used to show how the different technical services interact and deliver high quality products. The services involved were the SERA, the SDTM, the electronics service, the informatics service and the SILS. The outcome has been a very successful photo injector. This was possible because the technical services master all the strategic and sometimes highly specialized technologies. This realization has also shown the ability of the technical services to combine their efforts on a common goal.

However, this exercise has also shown the lack of manpower in some key tasks such as the piping work or the electricity power distribution. This is due to a severe staff reduction in LAL and a reduced staff in other laboratories, which in the past were providing these services. This reduction of staff in technical services is putting at risk the independence of LAL to conduct its projects. It is necessary to keep some technical expertise in all these fields also in order to efficiently sub-contract some part of the technical work.

The organization of the engineering and technical services at LAL has recently partially been changed with the creation of an accelerator department embedding all technical skills needed. The impact of this restructuring should be reviewed in about one year.

Nom de l'équipe : Engineering and technical services

Note de l'équipe	Qualité scientifique et production	Rayonnement et attractivité, intégration dans l'environnement	Stratégie, gouvernance et vie du laboratoire	Appréciation du projet
A+	A+	A+	A+	A+

5 • Appreciation of resources and of the life of the research unit

The LAL is a well-managed laboratory with well-equipped technical services and excellent professional staffs allowing important contributions to the various experiments; the level of staffing has decreased substantially over the past years and a continuation of this trend would jeopardize the impact of LAL; the Committee expresses the wish that adequate hiring of new staff is performed in order to maintain this level of competences. The existing infrastructures allow the mentioned quality of service and the proposed new procurements will ensure optimal exploitation in future.

LAL has a long-standing tradition of collaborating with other institutes and to make available its expertise in key technological fields. This policy should be continued as it optimizes the visibility of LAL as well as the resources usage. For it to be efficient, it requires that the technical expertise of LAL be maintained and sufficiently staffed. A potential difficulty lies in the definition of priorities between activities linked to the programs in which laboratory is directly involved and others. LAL's policy for technology transfer is very efficient.

Technological Platforms and Valorisation :

CALVA

Development started for the improvement of VIRGO, CALVA gathers staff from 5 laboratories and uses all the LAL competences to solve a difficult problem. It requires putting in place local infrastructure to be reused by future projects and it shows the benefit of the collaboration policy of LAL.

Mechanical workshop

Not a technological platform as such but a good example of the wish to share resources with others. This policy should be encouraged as it allows keeping in place large and up-to-date facilities.

GRIF project

Collaboration between 5 institutes from Ile de France to provide computing facilities based on the Grid. This project is a success in the sense of computing power made available to LHC experiments (probably one of the biggest TIER2 centre) but also because it is used by an increasing number of non-LHC experiments. Mutualisation of resources between different has allowed this to happen.

Microelectronics Pole

IN2P3 is organizing the microelectronics activity in poles in order to maintain groups with a critical mass. This initiative is excellent as in this field a lot of resources are needed just to maintain the tools. One of these poles is based on the LAL microelectronics group. It gathered 4 laboratories but a very large fraction is coming from LAL (11 people out of 13). LAL is internationally known for its expertise in microelectronics development. The group has a critical mass allowing it to be efficient (share of expertise, of tools, of design blocks). The outcome of this pole is very good (numerous ASICs used in different experiments). It has been noted that it has a quite large autonomy with respect to the rest of the electronics group and of the laboratory as it also provides some work for experiments in which the LAL is not involved. A clear way of handling priorities between different activities might be necessary.

Instrumentation

The LAL has created a dedicated group in charge of detector R&D and of support to experimental groups. So far the group invested in micromegas and in Silicon PM. Both choices are very good as these technologies are very likely to be used in future detectors. The technical support given to different experimental groups has been efficient and productive. This group is very versatile and collaborates with other groups from LAL (e.g. providing technical support to the micro-electronics group for tests and getting from them potential SiPM readout chips).

Valorisation

A small team (part time of three staff members) is producing a lot in making available a list of the LAL competences, putting in place collaborations and service providing contracts and patenting some LAL inventions. Future activities are clearly identified. The size of the team is optimal and LAL can really take benefit from this activity.

6 • Recommendations and advice

- Strong points:

The Committee was highly impressed by the quality and visibility of the LAL program which encompasses many of the most exciting scientific challenges in particle physics and cosmology. The quality and productivity of the staff is outstanding. This is the reason why LAL remains a leading laboratory on a world scale, attracting the best scientists at all levels, and maintaining unique technical abilities.

- Weak points:

The Committee found no major problems, except that of the continuing decrease in technical staff.

- Recommendations:

The Committee made a few recommendations concerning the manpower strength of certain activities.

It fears that continuing reduction of staff in technical services is putting at risk the capabilities of LAL.

Link to University

The new ‘Plan Campus’ offers interesting long-term perspectives for the development and possible relocation of LAL. In the ongoing discussions it is of vital importance to develop a clear plan, including the maintenance of the existing facilities.

Note de l'unité	Qualité scientifique et production	Rayonnement et attractivité, intégration dans l'environnement	Stratégie, gouvernance et vie du laboratoire	Appréciation du projet
A+	A+	A+	A+	A+

UNIVERSITÉ
PARIS-SUD 11

Le Président de l'Université Paris-Sud 11

à

Monsieur Pierre GLORIEUX
Directeur de la section des unités de recherche
AERES
20, rue Vivienne
75002 Paris

Orsay, le 11 mars 2009.

N/Réf. : 54/09/GCo/LM/LS

Objet : Rapport d'évaluation d'unité de recherche
N° **S2100012364**

Monsieur le Directeur,

Vous m'avez transmis le vingt cinq février dernier, le rapport d'évaluation de l'unité de recherche « Laboratoire de l'Accélérateur Linéaire » - LAL – UMR 8607, et je vous en remercie.

L'université se réjouit de l'appréciation portée par le Comité sur cette unité et prend bonne note de ses suggestions.

Veuillez trouver ci-dessous les quelques commentaires du directeur d'unité Monsieur Guy WORMSER :

« ... Il y a deux corrections de pure forme (ajout d'un sous titre Auger et Virgo par souci d'uniformité), et trois corrections de nature factuelle indiquées dans le rapport ci joint
- groupe BABAR un deuxième physicien rejoint LHCb . je propose de rajouter "up to now" dans le rapport
-groupe LHCb ; le groupe théorie n'est pas rattaché au groupe LHCb. Je propose de rajouter le mot "impact" pour bien montrer que le groupe théorie renforcera bien les travaux du groupe LHCb mais pas le groupe a proprement parler
-accélérateurs le chiffre de 23% FTE est surestimé soit 23% en terme de personnes soit 15% en terme de FTE. ... »

Je vous prie d'agréer, Monsieur le Directeur, l'expression de ma sincère considération.

Guy COURRAZE
Président

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