

6th April 2014

LIP International Advisory Committee

Meeting of 21st and 22nd March 2014 in Lisbon

Present: C. W. Fabjan, P. G. Innocenti, L. Rolandi.

The LIP International Advisory Committee met in Lisbon on 21st and 22nd March 2014 to review the 2013 results and to discuss the 2014 and long-range programme of work.

Prior to the meeting, Committee Members received a detailed report on the work carried out in 2013, a description of the activities planned for 2014 and the draft long-range plan 2015-2020.

Committee Members heard detailed presentations on the progress of each project; these presentations were attended by the entire LIP staff. This open meeting was the occasion for the Committee to deepen its understanding of the issues at stake in each project and to interact with the staff. The Committee appreciated the very high quality of the presentations and the professional preparation of the meeting.

Subsequently, Committee Members met with LIP Management: G. Barreira, P. Fonte, J. M. Gago, R. Marques and M. Pimenta.

The LIP groups of ATLAS and CMS continue making very significant contributions to the operation and the physics programme. Both teams are strongly involved in many analyses, including the measurements of the Higgs properties. They also have major responsibilities in the upgrade programme which is progressing following the plans: For ATLAS upgrade of the tile calorimeter, the high level jet trigger and the forward proton spectrometer; for CMS upgrade of the trigger of the electromagnetic calorimeter. The contributions by the LIP groups to the two large LHC experiments are very visible as shown also by major managerial and coordination positions in the CMS experiment.

The LIP group in Compass has strengthened its role in the physics programme and has assumed a leading role in the preparation of the upcoming run. The LIP group in HADES constructed and maintains the large Time-of-Flight detector that is instrumental to the physics program.

LIP is involved in a series of major astroparticle physics experiments. The AMS experiment on the ISS is now fully operational and has produced striking results. The LIP group contributes to the understanding of the complex apparatus and explores a new window with novel studies of low energy cosmic rays exploiting the RICH detector. The Auger

6th April 2014

experiment has produced intriguing results on the very high energy cosmic rays not consistent with standard interpretations. In order to better study these phenomena, the LIP group is vigorously promoting an upgrade of the detector with much improved muon identification capabilities based on the LIP RPC technology. Prototypes have been constructed in Coimbra and are field-tested in the Auger experiment. The LUX experiment has been remarkably successful with a rapid commissioning demonstrating design performance. The first physics run produced already the world's best limits on dark matter candidates. The LIP group shares major credits for this success as also shown by key positions of responsibility by LIP members in the project. The LIP group is a major driving force of the next generation Liquid Xenon dark matter detector LZ. A decision on the US funding of this detector is expected soon, a prerequisite for establishing the LZ experiment. The committee feels that this is the next logical step for exploiting the powerful Liquid Xenon TPC technique. The commissioning of the SNO+ detector is progressing with LIP delivering the calibration system. SNO+ will concentrate on the search for neutrinoless double beta decay.

LIP has a long-standing and vigorous programme on detector research and development. The LIP groups are to be commended for having been awarded a major grant "Rad for Life". This important and ambitious programme groups a number of activities covering detectors for medical applications, such as dosimetry and novel ways of X-ray imaging. One major development concerns the use of RPCs for a time of flight PET (TOF-PET). This technique holds the promise of an economic full body PET, as demonstrated by a complete simulation. A small scale RPC TOF-PET system for animal studies is well advanced. The Committee feels that this project should continue with the delivery of a full scale prototype. The development of Clear-PEM has been very successful with the construction of two machines, which are now installed in two hospitals and used for systematic studies on tracers for PET imaging. The next R&D step foresees the integration of PET imaging with MRI. In view of this development, silicon photomultipliers and their readout based on a LIP-developed very fast timing chip are being tested. Other activities include novel ways to detect neutrons, measurements of ion mobilities and scintillation properties of gas mixtures. Given the promising recent achievements and the important future goals of these detector R&D projects, the committee feels that their progress may be optimized by reviewing some of the priorities in this area.

A further area of outstanding success is the collaboration with ESA in qualifying components for space missions. This has developed into a sizable, visible and important program, which would profit from strengthening the personnel resources. Even a modest increase of personnel would make a large impact on the program.

The LIP scientific computing has grown into a facility of national importance, delivering computing power not only to LHC experiments but also to a large scientific community. The service has remained at a very high level of reliability in spite of a continued reduction of personnel, which has now reached a critical low level.

6th April 2014

Outreach continues to be a very successful activity. The committee has been pleased to learn that steps are foreseen to further strengthen this essential contribution.

The Committee was informed that the long-established procedure for funding has been suspended. The funding of some major projects will be terminated soon and payment of salaries would have to be stopped in a number of cases, should the funding process not be resumed swiftly. This is obviously a source of tremendous concern.

The Committee wishes to congratulate LIP for its impressive achievements and the very high quality of the work. LIP covers a remarkably wide programme of research, ranging from fundamental studies of matter to applied areas of high relevance to Society. In the long-range plan these activities are grouped into ten major areas, well-structured and focused, building on the strength of the present research. This structure and focus should further contribute to the success of the Laboratory.



C. W. Fabjan

P. G. Innocenti.

L. Rolandi