DESY PRC 71 Recommendations

(Final Revised Version – 27 May 2011)

CALICE

The PRC congratulates the CALICE collaboration for the successful development of future PFA (particle flow algorithm) calorimeters with an extensive variety of approaches and options. The PRC also congratulates the collaboration on its effective test beam campaigns at CERN and Fermilab so far and is very happy to see some of the important outcomes have been published as recommended in previous PRC meetings. The further efforts with the test beam, to improve prototypes as realistic components of future ILC detectors to be presented in the ILC DBDs in 2012, are highly supported.

The PRC notes the challenges associated with the provision of adequate test beam time, and the funding necessary to carry out the proposed program. The PRC recommends that DESY continues support for necessary modifications to test beam fixtures, test beam campaigns at CERN and Fermilab, continuation of electronics integration development, mechanical and electrical engineering, and provision of computing resources.

Since the PRC believes that the coherent effort in the shower simulation model development with the test beam results are extremely important to maximize the CALICE contribution to the field, it is requested CALICE to make a report at the next PRC meeting about their collaborative activities with the relevant group in this direction in conjunction with the current status of the shower simulations in general.

OLYMPUS

The PRC congratulates the collaboration for its great progress since the last meeting. That includes:

- bringing all the detectors, apart from the GEM tracker, to DESY
- having the first DORIS beam test run
- preparing test beam for the GEM lumi detectors, the MWPCs, the Moeller Calorimeter and the final DAQ for May 2011
- operating the torroid and doing field measurements.

The DORIS test run was very successful and showed that the background rates are reasonable and that DORIS is able to switch efficiently (<30min) between electrons and positrons. The design luminosity of OLYMPUS was reached. It also revealed a problem with heating of the target cell. The RF shielding design of the target cell as well as the cooling of the target cell was changed. The target cell should be tested as soon as possible best in the DORIS shutdown at the end of May, reinstalled into DORIS, and tested again. If this is not possible RF tests of the cell on a test bench should be performed and the target chamber/cell should be reinstalled with the rest of the detector in the middle of July.

At the next PRC a report on the May test beam results as well on the new beam tests of the target cell should be given. There should be also a summary on the status of the offline analysis software for OLYMPUS. This should be continuously pushed forward, since a fast offline analysis will be critical for the quality assurance of measured data in rather limited time window.

The PRC recommends that DESY makes any effort to avoid any delay of the 2nd running period at the end of 2012 due to delays in the PETRA shutdown. Further we recommend continual support from the laboratory, since it is really critical for the success of the experiment.

THEORY

The PRC congratulates the theory group for two successful junior staff hirings, which represent a very good match of phenomenological and theoretical physics beyond the Standard Model. Another junior appointment will strengthen the particle cosmology group.

The theory group has been active in new seminar initiatives that reflect current developments in particle physics and enhance the collaboration between the different particle physics activities in the Hamburg area (monthly LHC physics seminar, Pauli centre blackboard seminar).

The PRC specifically reviewed the activities in particle cosmology. Key research topics are identified as baryo-/leptogenesis, axion-like particles (WISPS), inflation theory and dark matter. The PRC recognizes that the DESY theory group plays a visible and important, and in some cases leading role in recent theoretical developments in these fields. The PRC encourages the particle cosmology and phenomenology theory groups to exploit more systematically their expertise on the dark matter/LHC physics interplay.

ALPS

The PRC appreciates the already very impressive efforts of the newly formed ALPS II collaboration. The PRC particularly recognizes the very fruitful and beneficial collaboration between the theoretical and experimental particle physics communities and the laser physicists from the gravitational wave detector community, and explicitly welcomes the efforts on improved single-photon detection using Transition Edge Sensors.

The PRC is willing to consider the possibility of a future ALPS II experiment at DESY and invites the ALPS collaboration to proceed towards a full technical design report.

The proposed multi-step procedure towards the full experiment, with the possibility of achieving new physics results on the way, is very much appreciated and DESY should provide the necessary support to the ALPS II collaboration to perform the preparatory steps.

Before being able to make a definitive statement on the full experiment it important to carefully evaluate the "physics case", including competing projects on the timescale 2013 - 2016. Ideally, this would happen in the form of a workshop once a draft version of the TDR is available.

The PRC will need additional external reviewers with expertise in laser physics and transition edge sensors.

CMS

We congratulate the DESY CMS group on their many strong contributions to the CMS experiment on detector operations, computing and upgrades. The group continues to play prominent roles in tracking alignment, data quality monitoring, operation of CASTOR and BCMF1, as well as in many management areas.
We are particularly pleased to see the strengthening of the organization for physics analyses and that the group is beginning to make strong impacts in several analysis areas. Contributions to published and upcoming papers are beginning to appear and the PRC looks forward to further expansion of DESY contributions.
The CASTOR detector should have its main pp data taking in the low luminosity regime which is coming rapidly to an end. The PRC requests a report at its next meeting on its current operation, physics output, potential physics output, and planning for future operations.

ATLAS

We congratulate the Atlas group for their very visible contributions to physics analyses. We note that a new YIG leader is needed to maintain these efforts in Zeuthen. We note with pleasure the increased manpower on the tracker upgrade – including those for the operations of the current SCT. We recommend that the group maintain a manpower level that is appropriate to the size of the project, so that they play a major role in the tracker upgrade.

COMPUTING

DESY has set up a high-performance Grid infrastructure for High Energy Physics (Tier2), which is very visible internationally. It supports the experiments ATLAS, CMS and LHCb within the LHC World-Wide computing Grid (WLCG).

The DESY Grid Centre also provides infrastructure for the HERA experiments and the ILC. DESY has also established a National Analysis Facility (NAF) for end-user analyses, which is well-accepted by the German user community.

Recently, DESY became involved in a new project, LHCone, aimed at improved network connections among the LHC Tier1 and Tier2 centres. The PRC welcomes the leading role, within Germany, of DESY in the LHCone project.

Based on the last PRC recommendations a task force report on future computing resources was expected for this meeting. As the PRC is concerned about future development of NAF, the committee eagerly awaits a detailed report specifying required services and resource planning for the coming years within the next weeks followed by a specially arranged phone conference on this topic.

For the years 2011 and 2012, there is still a substantial contribution of German universities to the LHC Tier2 computing, and the DESY share is well defined. The PRC appreciates the efficient and successful operation of the DESY Tier2 and recommends the timely installation of the DESY share of Tier2 resources in 2011 and 2012.

The PRC also encourages that DESY take an active role in finding ways to provide the necessary Tier2 resources to the German LHC community beyond 2012.

ZEUS

ZEUS analysis is progressing well according to planning presented to the PRC previously. The PRC is pleased to see that the transition to the common data format is now progressing well thanks to a common effort by the collaboration and the DESY management.

The PRC welcomes the initiative of ZEUS to define the future structure of the collaboration in order to be able to provide supervisors for students to scrutinize and approve ZEUS publications beyond 2014. A report is expected for the next PRC.

The PRC thanks the laboratory for its high level of support, and recommends that it maintain its level of support to secure successful completion of the physics program.

H1

The PRC congratulates H1 on their dedication to the physics analysis, which resulted in many new preliminary results and five publications in 2010. The convergence of the ongoing analyses should be closely monitored in order to ensure their publication within the next two years. It is vital that the financial support for eastern collaborators and the technical support from IT is adequately continued, e.g. the support of the analysis farm and the retention of experienced staff.

ZEUS/H1 COMBINED

The PRC congratulates the HERA collaborations on their impressive achievements in combining the results of the H1 and ZEUS collaborations. Combination of HERA results is vital to secure the HERA legacy and the H1/ZEUS combined analysis should get high priority. It is important to ensure the availability of the necessary expertise on a longer timescale. This should be included in the ongoing considerations on structures for supporting and authorizing publications after the end of the active collaborations. The importance of the combined results for the physics at the LHC and for cosmic ray physics should be more stressed. The work on the HERAPDFs should involve also the DESY theory group. A long term strategy for the future of the PDF effort should be worked out by the DESY management and the collaborations involved.

The data preservation project as an international effort is now led by the DESY groups. An effort should be made to try to keep the lead and benefit from it and support for the data preservation task is recommended beyond 2014.

HERMES

The HERMES collaboration continues to produce new results with high impact. This is well recognized by the community by still a high number of talks, such as at DIS-2011. The numbers of finished and publications in drafting stage is still impressive.

The Collaboration is especially congratulated for showing the first results for DVCS with the HERMES recoil detector. The PRC hopes the data are soon published and that the technical publication on the recoil detector is finalized.

For the next PRC the collaboration should show a plan of how to bring the data analysis to conclusion and how the structure of the collaboration is planned to be after 2012. Further a detail plan how HERMES is planning to preserve their data for analysis on the long term should be presented.

We recommend that DESY continues the highly appreciated support of the collaboration to extend the term for Postdocs and PhD students.

POL2000

The PRC acknowledges the efforts of the constantly decreasing polarisation group to finalize the analysis. Final results with reliable systematic errors should be given to the HERA collaborations as soon as possible.

ASTROPARTICLE (IceCube, CTA)

IceCube:
The IceCube installation was finished in December 2010. Over a period of 6 years a total of 86 strings has been deployed in the South Pole ice with an impressive precision and quality and an extremely low failure rate of Optical Modules. During the years of installation IceCube has been running with an accumulated exposure of about 2 cubic-kilometer-year. At the occasion of the official inauguration of IceCube on April 28th, 2011, the PRC congratulates the DESY members of the IceCube collaboration for their successful work. In the coming years DESY should extensively take part in the physics harvest.

CTA:
DESY has a strong involvement in CTA with contributions to the design and prototyping of the mid size telescope, the design of the array operation centre, electronics, analysis and computing. DESY has set-up a pre-prototype (quarter-dish) of the telescope structure and a full prototype is expected at the end of 2011. The YIG of Gernot Maier is well established. The group contributes significantly to the running and data analysis of the VERITAS telescope and to the design work for CTA. DESY is setting up the CTA analysis chain based on VERITAS experience. Further, DESY is performing detailed MC simulations for design optimization and for new reconstruction techniques. The PRC recommends that DESY keeps its strong hardware involvement and further strengthens its simulation and physics involvement.

General:

An application for the installation of a „Helmholtz Alliance on Astroparticle Physics" (HAP) was submitted in December 2010. The evaluation of the proposal in April 2011 was positive. The final decision will be taken by the Helmholtz Senate. DESY should play a leading role in the alliance.