Report from PRC

PRC70 Meeting: Findings / Recommendations

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on behalf of the PRC

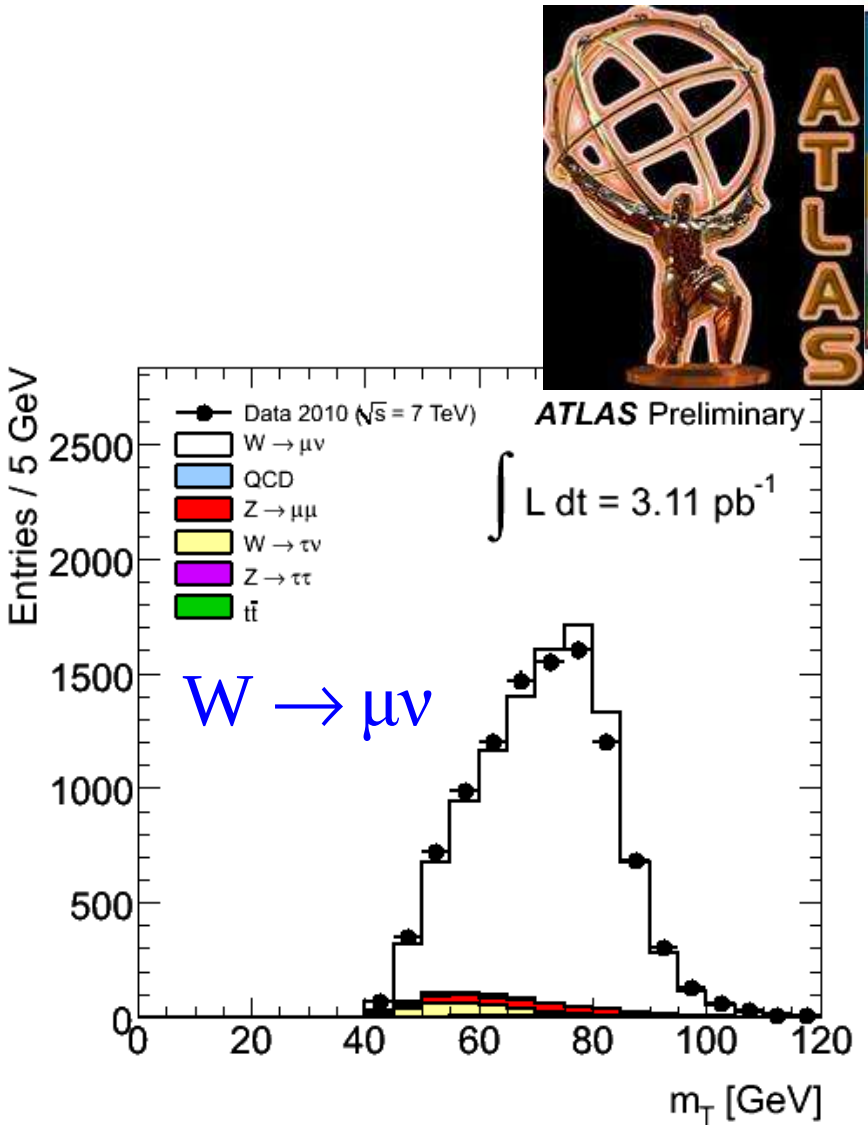
DESY Extended Scientific Council Meeting

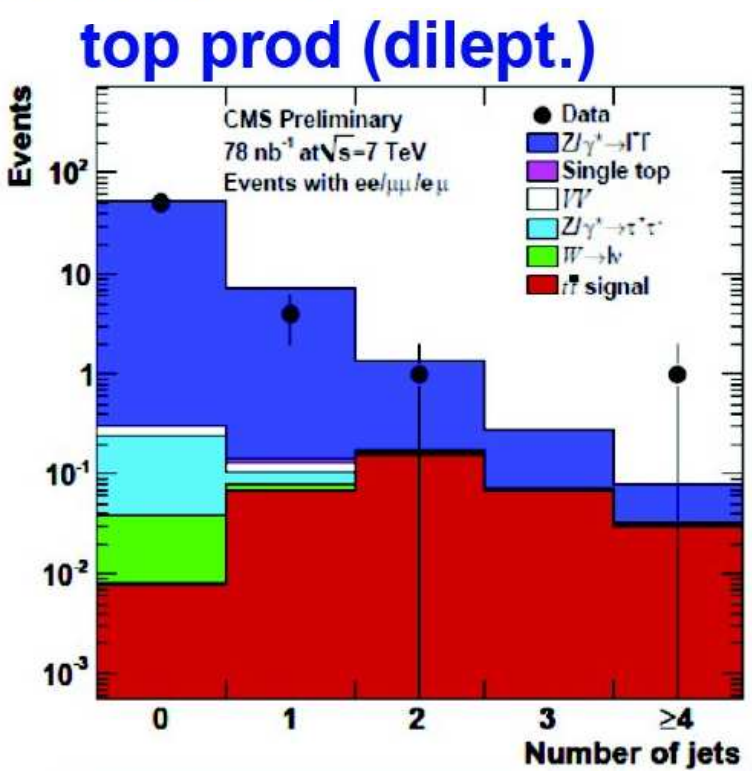
Nov 15, 2010

Topics

- HEP (experiments)
  - LHC experiments (including NAF, Grid)
  - HERA experiments, polarization, data preservation
  - OLYMPUS
- HEP (detector R&D)
  - TPC for a Linear Collider (LCTPC)
  - Silicon detectors for a Linear Collider (SiLC)
- Astroparticle physics
  - IceCube
  - CTA
- HEP theory (mainly mathematical physics/superstring theory)

DESY@LHC: ATLAS & CMS





DESY@LHC: ATLAS & CMS

- Detectors are running very well; physics analysis in full swing.
- The DESY groups are amongst the largest in both experiments, playing prominent roles in the collaborations.
- The DESY groups are very active in physics analysis.

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LHC upgrade projects mostly on track:

CMS

- layer 4 of new Si-pixel detector (installation 2015/16)
- replacement of photodetectors in hadron calorimeter (HPD $\rightarrow$ SiPm)

ATLAS

- ALFA luminosity detector
- endcap module prototype for new Si tracker of ATLAS: Petal2014
- level 1 trigger upgrade: implement topological information

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LHC upgrade projects mostly on track:

CMS

- layer 4 of new Si-pixel detector (installation 2015/16) — OK
- replacement of photodetectors in hadron calorimeter (HPD → SiPm) — OK but reduced scale/funding

ATLAS

- ALFA luminosity detector — OK
- endcap module prototype for new Si tracker of ATLAS: Petal2014
- level 1 trigger upgrade: implement topological information — on hold

DESY@LHC: ATLAS & CMS

The PRC comments:

- Congratulations to both groups for their significant achievements!
- The CMS group is recommended to strengthen direct contributions to current physics analyses.
- The ATLAS group is urged to evaluate the options for continuing the upgrade activity for the L1 trigger.

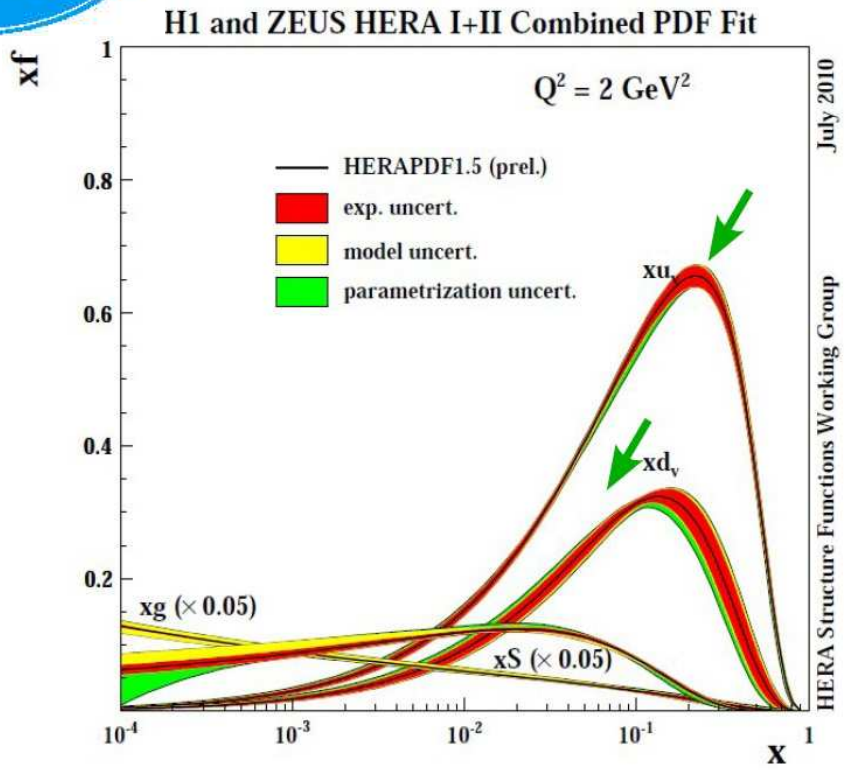
NAF and Tier2:

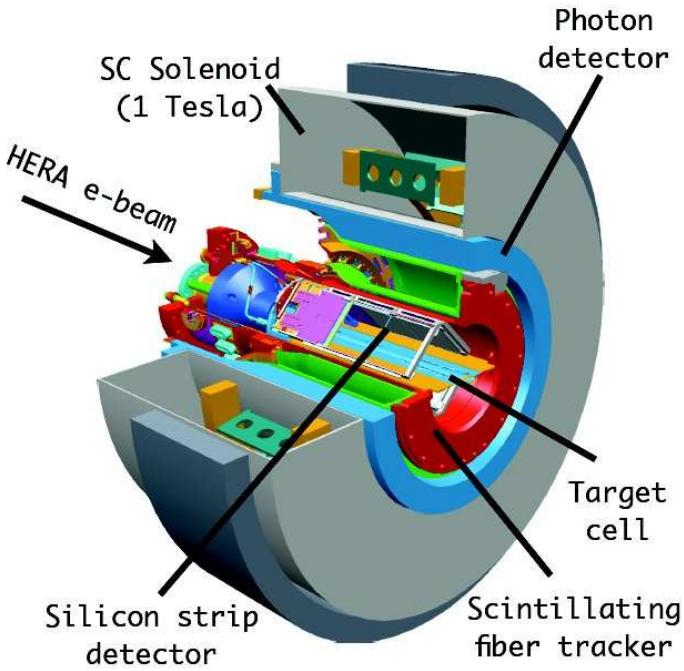
- DESY Tier2 infrastructure is very performant and well-accepted; it supports LHC & HERA experiments and ILC.
- National Analysis Facility (NAF) for end-user analyses well-used by German HEP community.

The PRC

- remarks that NAF/Tier2 represents major responsibility towards the German HEP community; these services need continuing support by the DESY management;
- welcomes the installation of a task force to evaluate efficiency of NAF/Tier2 and propose an upgrade-plan for coming years.

HERA Experiments: H1 & ZEUS / HERMES





HERA Experiments: H1 & ZEUS

- Physics analysis / publications mostly on schedule; few problematic cases.
- H1 and ZEUS are very actively contributing to conferences; the results are well received by the community.
- Both experiments have about 40 publications still to be finished, with number of active FTEs falling below 50.
- A reorganization of management and physics coordination is foreseen.

The PRC recommends

- to continue the high level of support;
- the DESY management to stay in close contact to the experiments to quickly identify bottlenecks.

HERA Experiments: ZEUS specific

- The transition in physics analysis to a new data format (common n-tuples) will not be finished as planned (by end 2011).
- This implies additional person-power requirements to maintain the old computing infrastructure.

The PRC

- requests from ZEUS to converge rapidly on a concrete plan for accomplishing the transition and define the required resources;
- expects a solution to be found in close collaboration between ZEUS and DESY managements and the participating ZEUS institutes.

HERA Experiments: HERMES

- Steady progress in physics analyses; large number of publications and conference contributions.
- HERMES is still the experiment with biggest impact in the field of spin physics.
- Steady progress with analyses including the recoil-detector; physics results expected soon.
- Person power for physics analyses stayed healthy.

HERA Experiments: HERMES

The PRC

- congratulates HERMES for the success in delivering high quality results in a timely manner;
- recommends that the lab should support the collaboration by finding ways to extend the terms of postdocs and PhD students who are needed for completing ongoing analyses.

The PRC

- feels that the physics with the recoil detector should receive still higher priority over analyses with less impact;
- would like to see the results on the beam spin asymmetry to be finalized;
- hopes to see an instrumentation paper on the recoil detector;
- HERMES should develop a strategy to streamline and prioritize remaining analysis topics.

HERA Experiments: Polarization (POL2000)

- LPOL data re-analyzed; systematic errors confirmed.
- New TPOL analysis commissioned after extensive Monte Carlo studies; systematic errors quantified; however a systematic correlation of TPOL analysing power with Compton photons emerged and is not understood.

The PRC

- acknowledges the significant effort of the small but dedicated group;
- urges the polarization group to terminate further studies on TPOL systematics within one month and then concentrate on summarizing the acquired knowledge and on producing realistic numbers for polarization errors, even if unfavorable.

HERA Experiments: Data Preservation

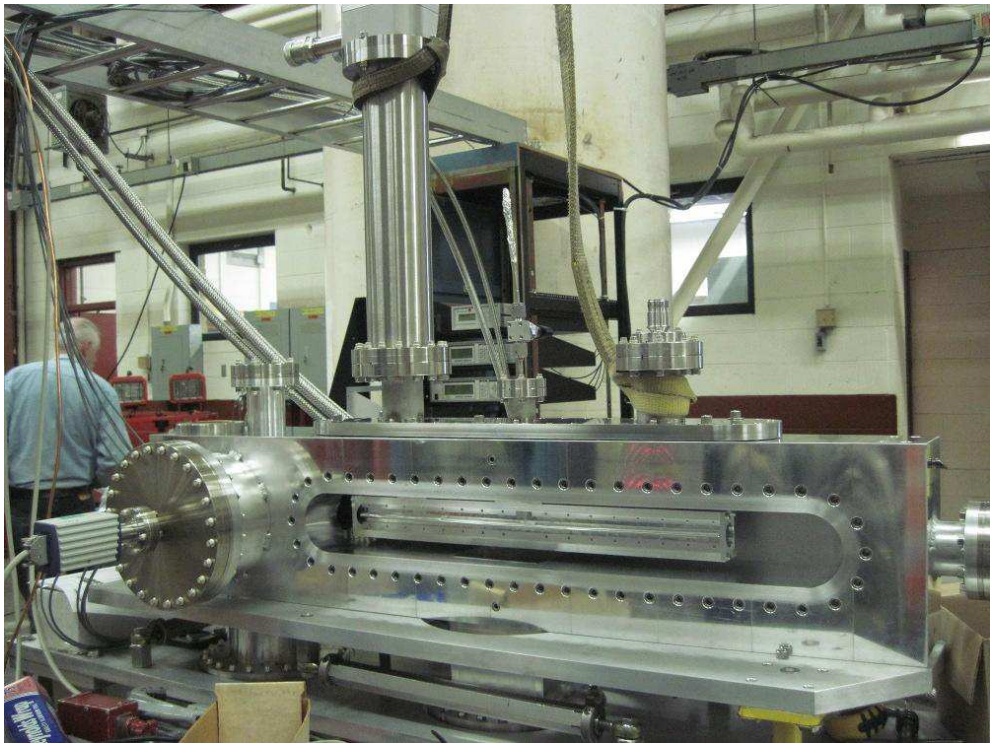
- Significant progress in further developing data preservation strategies.
- Presentation of these strategies well received by community on international workshops.
- A document on required resources has been submitted to the PRC.

HERA Experiments: Data Preservation

The PRC

- recommends that DESY supports the project such that the group can proceed to fully develop and implement the software validation framework;
- urges all participating DESY experiments to join forces from the beginning, even though final data formats may still be partially unknown;
- notes that the project requires the participating experiments to install structures for supporting and authorizing publications from preserved data after the end of the currently active collaborations;
- asks the DESY management to support the data preservation group to keep and, if possible, strengthen its international leadership.

OLYMPUS: Internal Target Experiment at DORIS



OLYMPUS: Internal Target Experiment at DORIS

- Preparations for detector set-up and infrastructure are proceeding very well.
- OLYMPUS collaboration is highly active on the DESY site and well supported by the lab.
- To be watched: forward lumi GEM-tracker delayed; several readout options for GEM detectors; tight time schedule for completion and installation of target chamber.

OLYMPUS: Internal Target Experiment at DORIS

The PRC congratulates the collaboration for their impressive achievements since the last PRC meeting…

… and recommends

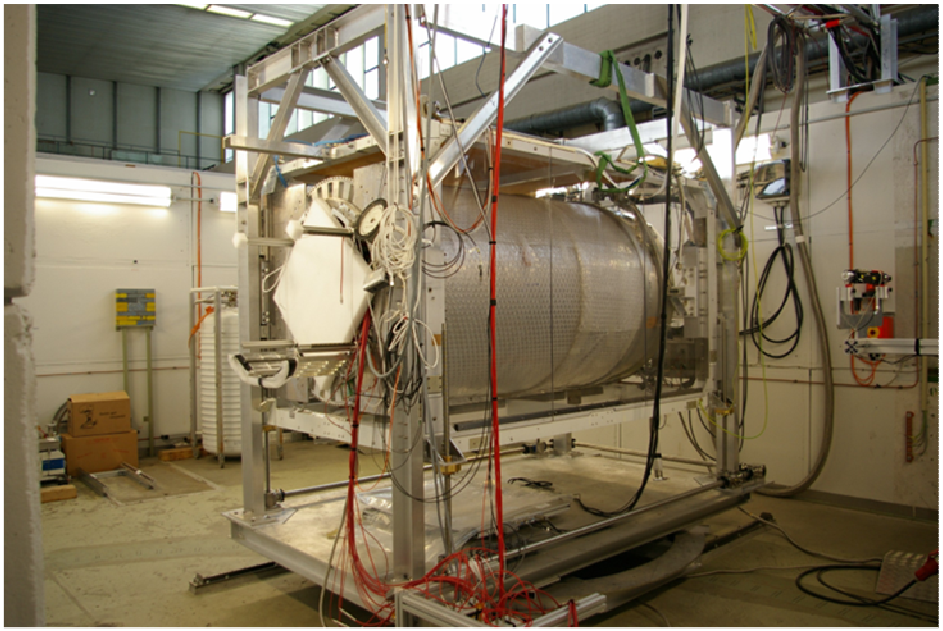
- that the lab continues the high level of support for OLYMPUS;
- that a definitive choice for the GEM readout is made asap;
- to closely monitor the forward GEM developments;
- to carefully test lepton charge switching and high rate running during the trial in February 2011;
- to vigorously continue development of analysis software, needed for rapid feedback on data quality.

ILC R&D: General Comment

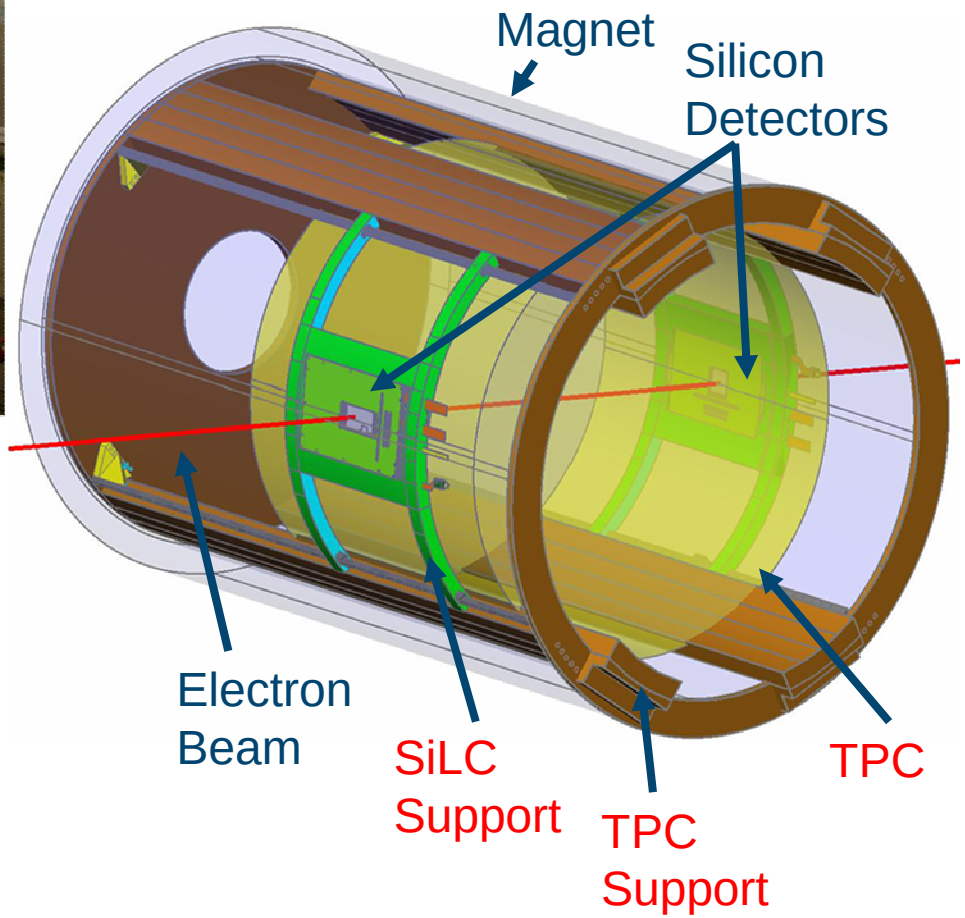
Reminder:

- Since many years, the PRC serves as evaluation board for ILC detector R&D beyond DESY activities.
- R&D projects are reviewed periodically;
  this time: main tracker (TPC and Si-detectors).
- ECFA is installing an evaluation board for detector R&D for projects not (yet) linked to / evaluated by a large laboratory; the mandate of the PRC will have to be adjusted.

ILC R&D: LCTPC and SiLC



EUDET infrastructure:
PCMAG@DESY (1.2 T)

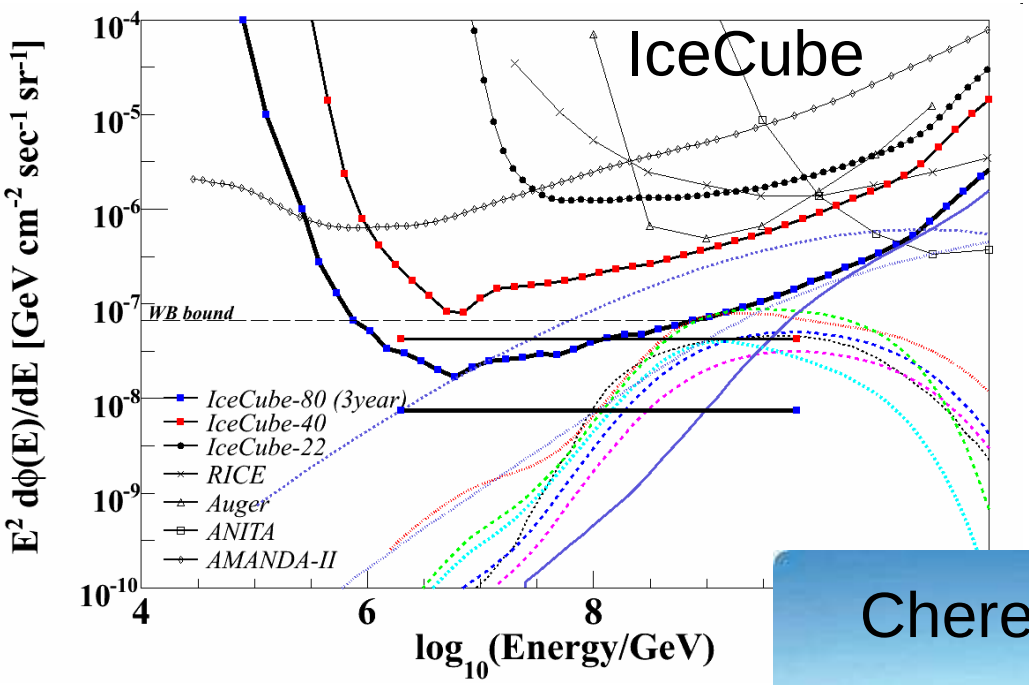


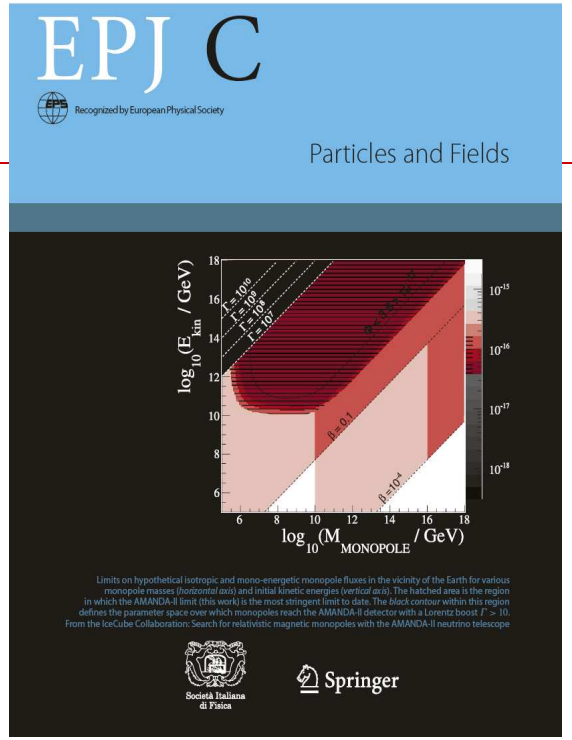
ILC R&D: LCTPC and SiLC

PRC comments concerning DESY:

- The EUDET infrastructure at DESY (1T PCMAG magnet, electron test beams) has been and will continue to be vital for detector R&D and prototype testing.
- For realistic high field tests, the availability of the COMAG (5T) high field facility at DESY is important. It should be brought to operation as soon as possible.

Astroparticle Physics:





Astroparticle Physics: IceCube

- IceCube detector close to completion.
- Drilling equipment stays at South Pole for further additions:
  - Deployment of NaI detectors to test direct Dark Matter search option.
  - Dense filling of inner core for supernova/gamma ray burst detection?
  - Brainstorming ongoing…
- Acoustic test for in-situ noise measurement being prepared.
- Large number of physics results published; much more expected from next unblinding in October 2010.
- Group is growing (1 new postdoc, several new PhD students, 1 visiting professorship)

The PRC congratulates IceCube for the rich physics output and notes with satisfaction that the DESY group is being ramped up for the upcoming observations with a fully operational detector. The PRC also acknowledges the excellent technical support by the lab, in particular in computing.

Astroparticle Physics: CTA

- CTA has entered EU funded Preparatory Phase Project.
- DESY plays coordinating role for medium size telescopes.
- CTA is evolving to a world-wide project.
- DESY CTA group now holds membership in MAGIC, VERITAS and Fermi LAT; it has close relations to H.E.S.S. (via Humboldt Univ.) and has a theory sub-group (DESY professorship at Univ. Potsdam).
- DESY group is growing (several new postdoc and PhD positions, partially through funds of the federal state of Brandenburg)

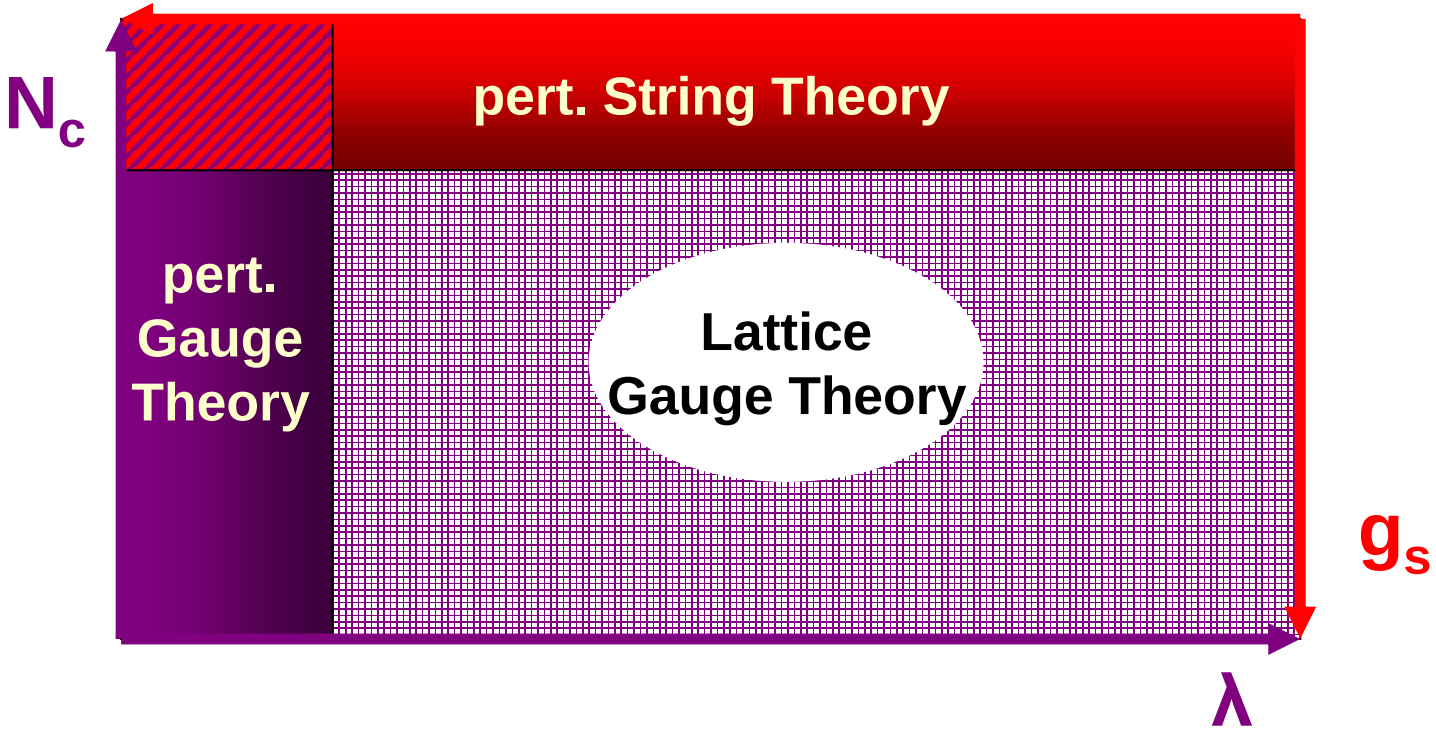
Astroparticle Physics: CTA

The PRC

- congratulates CTA for establishing their leading role in the EU Preparatory Phase Project;
- recommends to pursue current activities and exploit additional person power (PhDs) to strengthen physics analysis experience in running experiments;
- acknowledges the excellent financial and technical support of the CTA group by the lab.

Theory (mathematical physics/string theory)

Zentrum für Mathematische Physik Hamburg



Theory (mathematical physics/string theory)

- DESY theory group is part of a cooperation between mathematical and particle physicists (Univ. Hamburg) and a strong group of mathematicians (Univ. Hamburg).
- Research focus are non-perturbative aspects of gauge theories and connections to particle physics phenomenology and string theory based quantum gravity.

The PRC

- is impressed by the development of mathematical physics in Hamburg;
- sees the cooperation with particle physics and mathematics as a unique feature and strength of the lab;
- supports and encourages the present and mid-term research plans of the group.

The PRC

~~Thomas Lohse~~	~~HU Berlin~~	leaving
Andrew White	U of Texas	new chair
Gisela Anton	U Erlangen	
Elke Aschenauer	BNL	
Martin Beneke	RWTH Aachen	
Peter Buchholz	U Siegen	
Marcela Carena	FNAL	
Emmanuelle Perez	CERN	
Günter Quast	U Karlsruhe	new co-chair
~~Naohito Saito~~	~~KEK~~	leaving
~~Jan Timmermans~~	~~NIKHEF~~	leaving
Rik Yoshida	Argonne	

three new members to be found (list of candidates exists)