

DRAFT

CERN/DG/Research Board 2004-361
Minutes-169
28 July 2004

ORGANISATION EUROPÉENNE POUR LA RECHERCHE NUCLÉAIRE
CERN EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

CERN RESEARCH BOARD

**MINUTES OF THE 169th MEETING OF THE RESEARCH BOARD
HELD ON THURSDAY, 22 JULY 2004**

Present G. Altarelli, R. Aymar (Chairman), J. Äystö, P. Baillon*, J.J. Blaising,
G. Bossen, M. Calvetti, J. Dainton, J. Engelen, L. Evans, R. Forty (Secretary),
P. Geeraert, M. Hauschild, P. Lebrun, M. Metzger, S. Myers, A. Naudi,
T. Pettersson, T. Reposeur*, W. von Rüden, W. Zapf

* for Item 2

Apologies W.-D. Schlatter

Items

1. Procedure
2. Report on the Recognized Experiment GLAST/RE7
3. Report from the LHCC meeting of 30 June-1 July 2004
4. Report from the SPSC meeting of 6 July 2004
5. Report from the INTC meeting of 24-25 May 2004
6. Any other business

1. PROCEDURE

- 1.1 The **minutes** of the Research Board held on 27 May 2004 [1] were approved without modification.
- 1.2 A **matter arising** from those minutes concerned the approval of experiment P182 (nTOF-10) which was subject to satisfactory resolution of safety issues involved with the targets. R. Aymar reported that one of the proposed targets, ^{241}Am , had been refused on safety grounds, but the others available had been accepted. A review should be made of the safety conditions concerning the use of the targets, to see if there is room for improvement of those conditions.

2. REPORT ON THE RECOGNIZED EXPERIMENT GLAST/RE7

- 2.1 T. Reposeur gave a status report on the Recognized Experiment **GLAST**, the Gamma-ray Large Area Space Telescope. This is a satellite-based experiment, to be launched in February 2007, carrying two instruments: a large area telescope covering the energy range 20 MeV to 300 GeV, and a gamma-ray burst monitor covering the energy range 10 keV to 25 MeV. It will improve significantly on the performance of previous satellite-based gamma-ray observatories, such as EGRET, and provides overlap with the higher-energy ground-based detectors. The instrument includes a silicon tracker with tungsten converter for measurement of the photon direction, and a calorimeter based on CsI crystals. The current status is that the hardware design is finished, and engineering models have been assembled and tested. The flight modules should be completed by end-2005. Data challenges are being made to prepare the software, simulating sources over the full sky for one day (this year) and a month (next year).
- 2.2 P. Baillon then gave his report as CERN rapporteur for the experiment. He pointed out that there is a substantial involvement of European laboratories in the experiment, which is using the same techniques for cosmic ray studies as are used in particle physics. The experiment has a rich potential for the discovery of new phenomena. The collaboration is only making little use of CERN resources, and occasional use of test beam (in particular for the test of the calorimeter). **The Research Board approved the continuation of the Recognized Experiment status of GLAST for a further three years, as RE7.**

3. REPORT FROM THE LHCC MEETING OF 30 JUNE – 1 JULY 2004

- 3.1 M. Calvetti began his report from the LHCC with the presentation of the **TOTEM** Technical Design Report [2] and Addendum [3]. TOTEM will measure the total pp cross section at the LHC, and study elastic proton scattering. It uses two tracking telescopes on each side of the interaction point at Point 5, in a manner compatible with the CMS detector, to measure inelastic pp collisions. The precise determination of the total cross section also requires the measurement of elastic scattering down to low momentum transfers, $-t \sim 10^{-3} \text{ GeV}^2$, and this will be achieved with the use of two sets of silicon detectors located in Roman Pots at 147 m and 220 m from the interaction point. The proponents are also interested in the study of diffractive events, and M. Calvetti stated that the recommendation for approval was for all the physics that could be done with the proposed detectors. Operating the TOTEM detector in conjunction with CMS would enhance the study of hard diffraction events; but this requires further evaluation by the two collaborations. **The Research Board approved the technical design of TOTEM, as described in the TDR and Addendum. The final approval of the experiment will be considered at a later date, when its funding has been agreed. The proponents of the experiment are encouraged to further develop the collaboration between TOTEM and CMS.**
- 3.3 Next the situation concerning **electronics R&D** for upgrades to the LHC experiments was reported on, as had been discussed at the LHCC meeting of 24 March. At that meeting P. Sharp had reviewed a CMS workshop on the subject, which concluded that any upgrades to the electronics must build on the experience of the original development, involving the original teams in future R&D; given that in the next two years most of the design teams will have completed their commitments, now is a good time to start considering an R&D programme for eventual upgrades. The LHCC endorsed the initiative to extend the partnership with IBM from 0.25 μm CMOS technology into Deep Sub-Micron technologies. It also noted that a number of electronics R&D projects have already been identified by the LHC experiments, and that it is planned to develop these projects into future R&D proposals. The LHCC considered it important to have a central coordination of this effort at CERN, to ensure that the modern technologies remain available to the home institutes. **R. Aymar requested the PH department to review the current coordination for electronics R&D that is in place at CERN, and to report on whether there is a need for that effort to be reinforced.**
- 3.4 Finally M. Calvetti summarized the **Comprehensive Review of ATLAS** [4]. Very significant progress has been made towards the realization of the experiment since its last Comprehensive Review in July 2003. Construction of the majority of the final

components is either well underway or completed, installation of the technical infrastructure underground is well advanced, installation of the first sub-detector elements in the cavern has been successful, and preparations for commissioning of the experiment are in progress. However, the schedules of the Barrel and End-Cap Toroid magnets, the Barrel and End-Cap Semiconductor Tracker (SCT), and End-Cap A of the Transition Radiation Tracker (TRT) are considered to be critical. Nevertheless, the LHCC considers it realistic for ATLAS to have an initial working detector for the start of LHC operation in 2007, although detector installation can be foreseen beyond that date. **The Research Board took note of the report.**

4. REPORT FROM THE SPSC MEETING OF 6 JULY 2004

- 4.1 The report from the SPSC started with a presentation from M. Hauschild concerning the status of the machines and the proposed schedule of the run for the remainder of this year. There had been problems at the start of the run from Booster water leaks, the PS extraction septum failure and SPS vacuum leak, resulting in about two weeks' delay. It was proposed to extend the run by two weeks, ending on 15 November, to compensate for this. Furthermore, as NA48/2 was taking data at the start of the year, followed by NA60, the date for change-over between the two experiments was delayed by two weeks to 18 August. There has now been a second failure of the PS extraction septum, on the unit that was used to replace the one that had previously failed. An emergency repair had been performed on the first septum, allowing it to be reinstalled, with a total loss of about 12 physics days for the SPS. NA60 has requested 5 days of lower-energy running, at 158 GeV [5], which was recommended for approval by the SPSC, and has been included in the new schedule. **The modified schedule was approved by the Research Board.**
- 4.2 J. Dainton then reported on the other items from the recent SPSC meeting. **COMPASS/NA58** requested a three week run with a hadron beam before the end of this year, instead of the muon beam that they have been using so far. The request was recommended for approval by the SPSC, in particular since it was considered that the resulting data would lead to published results—J. Engelen will follow closely whether this turns out to be the case. In addition it would be important preparation for further proposed hadron running beyond 2005. **The Research Board endorsed the recommendation from the SPSC.**
- 4.3 The **CAST** experiment searches for solar axions using a decommissioned LHC test magnet, equipped with detectors to search for the X-rays that the axions would produce on

traversing the magnet. They have now achieved the best limits on solar axion production [6], and request a further run in 2006–7 filling the magnet bore with helium to extend the sensitivity to higher mass. This was recommended for approval by the SPSC. **However, as this involves running beyond 2005 the decision on approval was deferred until the next Research Board, so that the issue of the resources required could first be understood.**

- 4.4 **DIRAC/PS212** has submitted an Addendum to their proposal, for the lifetime measurement of $\pi\pi$ and πK atoms to test low-energy QCD [7]. The SPSC recommended it for approval, for one year of setting up in 2006 followed by two years of data taking in 2007-8. **Again, as this involves running beyond 2005 the decision on approval was deferred until the next Research Board, so that the issue of the resources required could first be understood.**

5. REPORT FROM THE INTC MEETING OF 24-25 MAY 2004

- 5.1 J. Äystö reported on the previous meeting of the INTC. Two proposals were recommended for approval at ISOLDE, and an additional proposal concerned a study of a target system for high intensity proton beams, proposed to be performed in the nTOF area.
- 5.2 **P138 Add. 2** (ISOLDE) *Investigation of astrophysically relevant neutron-rich argon nuclei* [8]. The measurements proposed could help explain the unusual isotopic abundancies observed in meteorites. A condition had been imposed by the INTC that the injection and breeding of radioactive ions in the source had to be proven prior to the experiment, but this has now been accomplished. **The experiment was approved for an allocation of 16 shifts; it will continue to be known as IS400.**
- 5.3 **P153** (ISOLDE) *Laser spectroscopy study on the neutron-rich and neutron-deficient Te isotopes* [9]. The proposal aims to measure nuclear moments and charge radii in the Te region, close to the $N = 82$ shell closure, and provide information on the evolution of shell structures far from stability. **The experiment was approved for an allocation of 23 shifts; it will be known as IS428.**
- 5.4 **P186** *Studies of a target system for a 4-MW, 24-GeV proton beam* [10]. The proposal is for a proof-of-principle test of a target station suitable for a Neutrino Factory or Muon Collider source, using a 24 GeV proton beam incident on a target consisting of a free mercury jet inside a 15 T capture solenoid magnet. It was recommended for approval by

the INTC on its scientific merits, but conditional on satisfactory resolution of issues concerning the implementation at CERN; in particular, concerns have been expressed by the Radiation Protection group. **The Research Board takes note of the recommendation, but before considering the experiment for approval requires further information on the support for the proposed test from the relevant scientific community, on the safety issues, and on the resources requested from CERN.**

6. ANY OTHER BUSINESS

- 6.1 The **next meeting** of the Research Board will be held on 2 December 2004. Dates for the meetings in 2005 were proposed, and are now confirmed: 3 March, 2 June, 1 September and 1 December 2005.

ENCLOSURES

1. Minutes of the 71st LHCC meeting held on 30 June-1 July 2004 (LHCC 2004-024).
2. Minutes of the 68th SPSC meeting held on 6 July 2004 (LHCC 2004-020).
3. Minutes of the 20th INTC meeting held on 24-25 May 2004 (INTC 2004-018).

REFERENCES

- [1] Minutes of the 168th meeting of the Research Board held on 27 May 2004 (CERN/DG/RB 2004-358, M168).
- [2] TOTEM Technical Design Report (LHCC 2004-002/TDR 1).
- [3] TOTEM Technical Design Report – Addendum 1 (LHCC 2004-020/TDR 1/Add. 1).
- [4] ATLAS Comprehensive Review (LHCC 2004-023/G079).
- [5] NA60 - Request for 7 days of primary protons at 158 GeV (SPSC 2004-012/M 715).
- [6] Status Report of the CAST experiment (SPSC 2004-019/M718).
- [7] Addendum to the DIRAC proposal (SPSC 2004-009/P284 Add. 4).
- [8] Investigation of astrophysically relevant neutron-rich argon nuclei (INTC 2004-005/P138 Add. 2).
- [9] Laser spectroscopy study on the neutron rich and neutron deficient Te isotopes (INTC 2004-017/P153 Add. 1).
- [10] Studies of a target system for a 4-MW, 24 GeV proton beam (INTC 2004-016/P186).