

Bibliography

- [1] CMS collaboration, *The Compact Muon Solenoid technical proposal*, CERN-LHCC-94-38, <http://cdsweb.cern.ch/record/290969>.
- [2] TOTEM collaboration, *The TOTEM Experiment at the LHC*, 2008 *JINST* **3** S08007.
- [3] CMS collaboration, *The CMS magnet project: technical design report*, CERN-LHCC-97-010, <http://cdsweb.cern.ch/record/331056>.
- [4] A. Hervé et al., *Status of the construction of the CMS magnet*, *IEEE Trans. Appl. Supercond.* **14** (2004) 524.
- [5] A. Hervé, *The CMS detector magnet*, *IEEE Trans. Appl. Supercond.* **10** (2000) 389.
- [6] F. Kircher et al., *Final design of the CMS solenoid cold mass*, *IEEE Trans. Appl. Supercond.* **10** (2000) 407.
- [7] ALEPH collaboration, *ALEPH: a detector for electron-positron annihilation at LEP*, *Nucl. Instrum. Meth. A* **294** (1990) 121.
- [8] DELPHI collaboration, *The DELPHI detector at LEP*, *Nucl. Instrum. Meth. A* **303** (1991) 233.
- [9] ZEUS collaboration, *The ZEUS detector*, unpublished, available at <http://www-zeus.desy.de/bluebook/bluebook.html>.
- [10] BABAR collaboration, *The BABAR detector*, *Nucl. Instrum. Meth. A* **479** (2000) 1.
- [11] I. Horvath et al., *The CMS conductor*, *IEEE Trans. Appl. Supercond.* **12** (2002) 345.
- [12] S. Sgobba et al., *Mechanical performance at cryogenic temperature of the modules of the external cylinder of CMS and quality controls applied during their fabrication*, *IEEE Trans. Appl. Supercond.* **14** (2004) 556.
- [13] P. Fabbricatore et al., *The construction of the modules composing the CMS superconducting coil*, *IEEE Trans. Appl. Supercond.* **14** (2004) 552.
- [14] P. Fazilleau et al., *Design, construction and tests of the 20kA current leads for the CMS solenoid*, *IEEE Trans. Appl. Supercond.* **14** (2004) 1766.

- [15] CMS collaboration, *The CMS tracker system project: technical design report*, CERN-LHCC-98-006, <http://cdsweb.cern.ch/record/368412>.
- [16] CMS collaboration, *The CMS tracker: addendum to the technical design report*, CERN-LHCC-2000-016, <http://cdsweb.cern.ch/record/490194>.
- [17] CMS collaboration, *CMS Physics Technical Design Report Volume 1: Detector Performance and Software*, CERN-LHCC-2006-001, <http://cdsweb.cern.ch/record/922757>; CMS collaboration, *CMS Physics Technical Design Report Volume 2: Physics Performance*, *J. Phys. G* **34** (2006) 995, CERN-LHCC-2006-021, <http://cdsweb.cern.ch/record/942733>.
- [18] ROSE collaboration, *2nd RD48 status report: R & D on silicon for future experiments*, CERN-LHCC-98-039, <http://cdsweb.cern.ch/record/376432>.
- [19] M. Atac et al., *Beam test results of the US-CMS forward pixel detector*, *Nucl. Instrum. Meth. A* **488** (2002) 271.
- [20] G. Bolla et al., *Design and test of pixel sensors for the CMS experiment*, *Nucl. Instrum. Meth. A* **461** (2001) 182.
- [21] J. Kemmer et al., *Streifendetektor*, Patentoffenlegungsschrift DE 19620081 A1, Munich, Germany, 21 October 1997.
- [22] K. Arndt et al., *Silicon sensors development for the CMS pixel system*, *Nucl. Instrum. Meth. A* **511** (2003) 106.
- [23] Y. Allkofer et al., *Design and performance of the silicon sensors for the CMS barrel pixel detector*, *Nucl. Instrum. Meth.* **584** (2008) 25.
- [24] G. Lindström et al., *Radiation hard silicon detectors — Developments by the RD48 (ROSE) collaboration*, *Nucl. Instrum. Meth. A* **466** (2001) 308.
- [25] D. Kotlinski, *The control and readout system of the CMS pixel barrel detector*, *Nucl. Instrum. Meth. A* **565** (2006) 73.
- [26] H.C. Kästli, *Design and performance of the CMS pixel detector readout chip*, *Nucl. Instrum. Meth. A* **565** (2006) 188.
- [27] E. Bartz, *The 0.25 μ m token bit manager chip for the CMS pixel readout*, in *Proceedings of the 11th Workshop on Electronics for LHC and Future Experiments*, Heidelberg Germany (2005).
- [28] K. Kloukinas et al., *FEC-CCS: a common front-end controller card for the CMS detector electronics*, in *Proceedings of the 12th Workshop on Electronics for LHC and Future Experiments*, Valencia Spain (2006), <http://cdsweb.cern.ch/record/1027434>.
- [29] CERN ASICS manuals, online at <http://cmstrackercontrol.web.cern.ch/cmstrackercontrol/manuals.htm>.

- [30] G. Bolla et al., *Wire-bond failures induced by resonant vibrations in the CDF silicon detector*, *IEEE Nucl. Sci. Symp. Conf. Rec.* **3** (2003) 1641.
- [31] D. Menasce, M. Turqueti and L. Uplegger, *The renaissance: a test-stand for the forward CMS pixel tracker assembly*, *Nucl. Instrum. Meth. A* **579** (2007) 1141.
- [32] S. Paoletti et al., *The powering scheme of the CMS silicon strip tracker*, in *10th Workshop on Electronics for LHC and future experiments*, CERN-2004-010, CERN-LHCC-2004-030, <http://cdsweb.cern.ch/record/814088>.
- [33] R. Fenner and E. Zdankiewicz, *Micromachined water vapor sensors: a review of sensing technologies*, *IEEE Sens. J.* **1** (2001) 309.
- [34] SIEMENS, SIMATIC, *Statement List (STL) for S7-300 and S7-400 programming*, reference manual, Siemens ag automation and drives, http://www.fer.hr/_download/repository/S7_300_STL_programming_manual.pdf.
- [35] *Interface for accessing the PVSS system through SOAP XML protocol*, online at <http://xdaqwiki.cern.ch/index.php/PSX>.
- [36] L. Borrello et al., *Sensor design for the CMS silicon strip tracker*, CMS-NOTE-2003-020, <http://cdsweb.cern.ch/record/687861>.
- [37] J.L. Agram et al., *The silicon sensors for the Compact Muon Solenoid tracker: design and qualification procedure*, *Nucl. Instrum. Meth. A* **517** (2004) 77.
- [38] S. Braibant et al., *Investigation of design parameters for radiation hard silicon microstrip detectors*, *Nucl. Instrum. Meth. A* **485** (2002) 343.
- [39] M. Raymond et al., *The CMS Tracker APV25 0.25 μ mCMOS readout chip*, in *Proceedings of the 6th Workshop on Electronics for LHC Experiments*, Cracow Poland (2000).
- [40] A. Marchioro, *Deep submicron technologies for HEP*, in *Proceedings of the 4th Workshop on Electronics for LHC Experiments*, Rome Italy, CERN-LHCC-98-36, CERN-LHCC-40-46, <http://cdsweb.cern.ch/record/405093>.
- [41] J. Troska et al., *Optical readout and control systems for the CMS tracker*, *IEEE Trans. Nucl. Sci.* **50** (2003) 1067.
- [42] Telecommunications Industry Association, *Electrical characteristics of Low Voltage Differential Signaling (LVDS) interface circuits*, ANSI/TIA/EIA-644-A-2001.
- [43] F. Vasey, C. Biber, M. Sugiyama and J. Troska, *A 12-channel analog optical-receiver module*, *J. Lightwave Technol.* **23** (2005) 4270.
- [44] K. Gill et al., *Progress on the CMS tracker control system*, in *Proceedings of the 11th Workshop on Electronics for LHC and Future Experiments*, Heidelberg Germany (2005), <http://cdsweb.cern.ch/record/921198>.

- [45] J. Coughlan et al., *The CMS tracker front-end driver*, in *Proceedings of the 9th Workshop on Electronics for LHC Experiments*, Amsterdam, The Netherlands (2003), <http://cdsweb.cern.ch/record/722058>.
- [46] C. Ljuslin, A. Marchioro and C. Paillard, *The CCU25: a network oriented communication and control unit integrated circuit in a 0.25 μm CMOS technology*, in *Proceedings of the 8th Workshop on Electronics for LHC Experiments*, Colmar France (2002), <http://cdsweb.cern.ch/record/593914>.
- [47] K. Kloukinas, A. Marchioro, P. Moreira and P. Placidi, *A 40 MHz clock and trigger recovery circuit for the CMS tracker fabricated in a 0.25 μm CMOS technology and using a self calibration technique*, in *Proceedings of the 5th Workshop on Electronics for LHC Experiments*, Snowmass U.S.A. (1999).
- [48] Philips Semiconductors, *The I²C-bus specification, version 2.1*, document order number 9398 393 40011, January (2001), <http://www.semiconductors.philips.com/i2c>.
- [49] G. Magazzu, A. Marchioro and P. Moreira, *The detector control unit: an ASIC for the monitoring of the CMS silicon tracker*, *IEEE Trans. Nucl. Sci.* **51** (2004) 1333.
- [50] U. Goerlach, *Industrial production of front-end hybrids for the CMS silicon tracker*, in *Proceedings of the 9th Workshop on Electronics for LHC Experiments*, Amsterdam, The Netherlands (2003), <http://cdsweb.cern.ch/record/720615>.
- [51] M. Axer et al., *The qualification of silicon microstrip detector modules for the CMS inner tracking detector*, CMS-NOTE-2006-141, <http://cdsweb.cern.ch/record/1000390>.
- [52] P. Schleper, G. Steinbrück and M. Stoye, *Software alignment of the CMS tracker using MILLEPEDE II*, CMS-NOTE-2006-011, <http://cdsweb.cern.ch/record/926543>.
- [53] E. Widl, R. Frühwirth and W. Adam, *A Kalman filter for track-based alignment*, CMS-NOTE-2006-022, <http://cdsweb.cern.ch/record/927376>.
- [54] V. Karimäki, A. Heikkinen, T. Lampén and T. Lindén, *Sensor alignment by tracks*, in *Proceedings of the CHEP2003 - International Conference on Computing in High Energy and Nuclear Physics*, La Jolla U.S.A. (2003), CMS-CR-2003-022, <http://cdsweb.cern.ch/record/619975>.
- [55] R. Brauer et al., *Design and test beam performance of substructures of the CMS tracker end caps*, CMS-NOTE-2005-025, <http://cdsweb.cern.ch/record/927381>.
- [56] CMS TIB collaboration, *Validation tests of CMS TIB/TID structures*, in preparation.
- [57] W. deBoer et al., *The performance of irradiated CMS silicon micro-strip detector modules*, CMS-NOTE-2006-049, <http://cdsweb.cern.ch/record/951391>.
- [58] A. Chilingarov et al., *Radiation studies and operational projections for silicon in the ATLAS inner detector*, *Nucl. Instrum. Meth. A* **360** (1995) 432.

- [59] CERN DETECTOR R&D collaboration RD2, E. Fretwurst et al., *Reverse annealing of the effective impurity concentration and long term operational scenario for silicon detectors in future collider experiments*, *Nucl. Instrum. Meth. A* **342** (1994) 119.
- [60] M.M. Angarano et al., *Study of radiation damage and substrate resistivity effects from beam test of silicon microstrip detectors using LHC readout electronics*, CMS-NOTE-2000-053, <http://cdsweb.cern.ch/record/593000>.
- [61] H.W. Gu et al., *High voltage operation of heavily irradiated silicon microstrip detectors*, CMS-CR-1999-010, <http://cdsweb.cern.ch/record/687105>.
- [62] PARTICLE DATA GROUP collaboration, S. Eidelman et al., *Review of particle physics*, *Phys. Lett. B* **592** (2004) 1.
- [63] P. Lecoq et al, *Lead tungstate ($PbWO_4$) scintillators for LHC EM calorimetry*, *Nucl. Instrum. Meth. A* **365** (1995) 291;
 S. Baccaro et al., *Influence of La^{3+} -doping on radiation hardness and thermoluminescence characteristics of $PbWO_4$* , *Phys. Status Solidi A* **160** (1997) R5;
 E. Auffray et al., *Improvement of several properties of lead tungstate crystals with different doping ions*, *Nucl. Instrum. Meth. A* **402** (1998) 75;
 M. Kobayashi et al., *Improvement of radiation hardness of $PbWO_4$ scintillating crystals by La-doping*, *Nucl. Instrum. Meth. A* **404** (1998) 149;
 H.F. Chen et al., *Radiation damage measurements of undoped lead tungstate crystals for the CMS electromagnetic calorimeter at LHC*, *Nucl. Instrum. Meth. A* **414** (1998) 149;
 H. Hofer et al., *Afterglow measurements of lead tungstate crystals*, *Nucl. Instrum. Meth. A* **433** (1999) 630;
 M. Kobayashi et al., *Significant improvement of $PbWO_4$ scintillating crystals by doping with trivalent ions*, *Nucl. Instrum. Meth. A* **434** (1999) 412.
- [64] A.A. Annenkov, M.V. Korzhik and P. Lecoq, *Lead tungstate scintillation material*, *Nucl. Instrum. Meth. A* **490** (2002) 30.
- [65] I. Dafinei, E. Auffray, P. Lecoq M. Schneegans, *Lead tungstate for high energy calorimetry*, *Mat. Res. Soc. Symp. Proc.* **348** (1994) 99, also in *Proceedings of Scintillator and Phosphor Materials Symposium*, San Francisco U.S.A. (1994).
- [66] X.D. Qu, L.Y. Zhang and R.Y. Zhu, *Radiation induced color centers and light monitoring for lead tungstate crystals*, *IEEE Trans. Nucl. Sci.* **47** (2000) 1741.
- [67] S. Baccaro et al., *Ordinary and extraordinary complex refractive index of the lead tungstate ($PbWO_4$) crystals*, *Nucl. Instrum. Meth. A* **385** (1997) 209.
- [68] D. Graham and C. Seez, *Simulation of Longitudinal Light Collection Uniformity in $PbWO_4$ crystals*, CMS-NOTE-1996-002, <http://cdsweb.cern.ch/record/687541>.
- [69] CMS collaboration, *The electromagnetic calorimeter project: technical design report*, CERN-LHCC-97-033, <http://cdsweb.cern.ch/record/349375>; *Changes to CMS ECAL*

- electronics: addendum to the technical design report*, CERN-LHCC-2002-027,
<http://cdsweb.cern.ch/record/581342>.
- [70] R.Y. Zhu, *Radiation damage in scintillating crystals*, *Nucl. Instrum. Meth. A* **413** (1998) 297.
- [71] M. Huhtinen et al., *High-energy proton induced damage in PbWO₄ calorimeter crystals*, *Nucl. Instrum. Meth. A* **545** (2005) 63.
- [72] P. Lecomte et al., *High-energy proton induced damage study of scintillation light output from PbWO₄ calorimeter crystals*, *Nucl. Instrum. Meth. A* **564** (2006) 164.
- [73] M. Lebeau, F. Mossire and H. Rezvani Naraghi, *The super-basket: incorporation of conical reinforcements in the CMS ECAL EB support structure*, CMS-NOTE-2003-010,
<http://cdsweb.cern.ch/record/687869>.
- [74] THE CMS ELECTROMAGNETIC CALORIMETER group, P. Adzic et al., *Results of the first performance tests of the CMS electromagnetic calorimeter*, *Eur. Phys. J. C* **44** (2006) S1.1
- [75] K. Deiters et al., *Double screening tests of the CMS ECAL avalanche photodiodes*, *Nucl. Instrum. Meth. A* **543** (2005) 549.
- [76] S. Baccaro et al., *Radiation damage effect on avalanche photo diodes*, *Nucl. Instrum. Meth. A* **426** (1999) 206.
- [77] A. Bartoloni, *The power supply system for CMS-ECAL APDs*, in *Proceedings of the 7th Workshop on Electronics for LHC Experiments*, Stockholm Sweden (2001),
<http://cdsweb.cern.ch/record/530694>;
A. Bartoloni et al., *High voltage system for the CMS electromagnetic calorimeter*, *Nucl. Instrum. Meth. A* **582** (2007) 462.
- [78] K.W. Bell et al., *Vacuum phototriodes for the CMS electromagnetic calorimeter endcap*, *IEEE Trans. Nucl. Sci.* **51** (2004) 2284;
N.A. Bajanov et al., *Fine-mesh photodetectors for CMS endcap electromagnetic calorimeter*, *Nucl. Instrum. Meth. A* **442** (2000) 146;
Yu. Blinnikov et al., *Radiation hardness, excess noise factor and short-term gain instability of vacuum phototriodes for the operation in pseudorapidity range $1.5 \leq \eta \leq 3.0$ at CMS ECAL*, *Nucl. Instrum. Meth. A* **504** (2003) 228.
- [79] K.W. Bell et al., *The response to high magnetic fields of the vacuum phototriodes for the Compact Muon Solenoid endcap electromagnetic calorimeter*, *Nucl. Instrum. Meth. A* **504** (2003) 255.
- [80] Yu. I. Gusev et al., *Super radiation hard vacuum phototriodes for the CMS endcap ECAL*, *Nucl. Instrum. Meth. A* **535** (2004) 511.
- [81] B. Betev et al., *Low voltage supply system for the very front end readout electronics of the CMS electromagnetic calorimeter*, in *9th Workshop on Electronics for LHC Experiments*,

- Amsterdam The Netherlands (2003), CERN-LHCC-2003-055 page 353,
<http://cdsweb.cern.ch/record/744282>.
- [82] M. Raymond et al., *The MGPA electromagnetic calorimeter readout chip for CMS*, in 9th Workshop on Electronics for LHC Experiments, Amsterdam The Netherlands (2003), CERN-LHCC-2003-055 page 83, <http://cdsweb.cern.ch/record/712053>.
- [83] G. Minderico et al., *A CMOS low power, quad channel, 12 bit, 40 MS/s pipelined ADC for applications in particle physics calorimetry*, in 9th Workshop on Electronics for LHC Experiments, Amsterdam The Netherlands (2003), CERN-LHCC-2003-055 page 88, <http://cdsweb.cern.ch/record/712054>.
- [84] M. Hansen, *The new readout architecture for the CMS ECAL*, in 9th Workshop on Electronics for LHC Experiments, Amsterdam The Netherlands (2003), CERN-LHCC-2003-055 page 78, <http://cdsweb.cern.ch/record/712052>.
- [85] R. Alemany et al., *CMS ECAL off-detector electronics*, in Proceedings of the 11th International Conference on Calorimetry in High Energy Physics (CALOR2004), Perugia Italy (2004), CMS-CR-2004-022, <http://cdsweb.cern.ch/record/787474>.
- [86] R. Alemany et al., *Overview of the ECAL off-detector electronics of the CMS experiment*, IEEE Nucl. Sci. Symp. Conf. Rec. **2** (2004) 1053.
- [87] P. Paganini et al., *Tests of the boards generating the CMS ECAL trigger primitives: from the on-detector electronics to the off-detector electronics system*, in Proceedings of the 10th Workshop on Electronics for LHC Experiments, Boston U.S.A. (2004), CMS-CR-2004-066, <http://cdsweb.cern.ch/record/814461>.
- [88] N. Almeida et al., *Calorimeter trigger synchronization in CMS, implementation and test system*, in Proceedings of the 10th Workshop on Electronics for LHC Experiments, Boston U.S.A. (2004), CMS-CR-2004-068, <http://cdsweb.cern.ch/record/823745>.
- [89] N. Almeida et al., *Data concentrator card and test system for the CMS ECAL readout*, in Proceedings of the 9th Workshop on Electronics for the LHC Experiments, Amsterdam The Netherlands (2003), CMS-CR-2003-056, <http://cdsweb.cern.ch/record/692739>.
- [90] R. Alemany et al., *Test results of the data concentrator card of the CMS electromagnetic calorimeter readout system*, in Proceedings of the 10th Workshop on Electronics for LHC Experiments, Boston U.S.A. (2004), <http://cdsweb.cern.ch/record/814237>.
- [91] N. Almeida et al., *The selective read-out processor for the CMS electromagnetic calorimeter*, IEEE Nucl. Sci. Symp. Conf. Rec. **3** (2004) 1721.
- [92] R. Loos et al., *CMS ECAL Preshower and Endcap Engineering Design Review. v.2 - Preshower*, CMS-2000-054-MEETING, CERN-ECAL-EDR-4, <http://cdsweb.cern.ch/record/539819>.

- [93] P. Aspell et al., *PACE3: A large dynamic range analogue memory ASIC assembly designed for the readout of silicon sensors in the LHC CMS preshower*, in *Proceedings of the 10th Workshop on Electronics for LHC Experiments*, Boston U.S.A. (2004), <http://cdsweb.cern.ch/record/814076>.
- [94] I. Evangelou, *CMS Preshower in-situ absolute calibration*, in *Proceedings of the 9th ICATPP conference*, Villa-Olmo, Como Italy (2005), <http://cdsweb.cern.ch/record/981557>.
- [95] K. Kloukinas et al., *Kchip: a radiation tolerant digital data concentrator chip for the CMS Preshower detector*, in *Proceedings of the 9th Workshop on Electronics for LHC Experiments*, Amsterdam The Netherlands (2003), CERN-LHCC-2003-055 page 66, <http://cdsweb.cern.ch/record/712049>.
- [96] G. Antchev et al., *A VME-based readout system for the CMS preshower sub-detector*, *IEEE Trans. Nucl. Sci.* **54** (2007) 623.
- [97] S. Reynaud and P. Vichoudis, *A multi-channel optical plug-in module for gigabit data reception*, in *Proceedings of the 12th Workshop on Electronics for LHC and Future Experiments*, Valencia Spain (2006), CERN-LHCC-2007-006, <http://cdsweb.cern.ch/record/1027469>.
- [98] D. Barney et al., *Implementation of on-line data reduction algorithms in the CMS endcap preshower data concentrator card*, 2007 *JINST* **2** P03001.
- [99] P. Adzic et al., *The detector control system for the electromagnetic calorimeter of the CMS experiment at the LHC*, in *Proceedings of the 10th International Conference on Accelerator and Large Experimental Physics Control Systems (ICALEPS2005)*, Geneva Switzerland, CMS-CR-2005-028, <http://cdsweb.cern.ch/record/904796>.
- [100] P. Milenovic et al., *Performance of the CMS ECAL safety system for Super Modules SM0 and SM1*, *Nucl. Instrum. Meth. A* **554** (2005) 427.
- [101] F. Cavallari et al., *CMS ECAL intercalibration of ECAL crystals using laboratory measurements*, CMS-NOTE-2006-073, <http://cdsweb.cern.ch/record/962038>.
- [102] W. Bertl et al., *Feasibility of intercalibration of CMS ECAL supermodules with cosmic rays*, *Eur. Phys. J. C* **41** (2005) S2.11;
F. Ferri and P. Govoni, *The CMS electromagnetic calorimeter pre-calibration with cosmic rays and test beam electrons*, in *Proceedings of VCI2007*, Vienna Austria, CMS-CR-2007-012, <http://cdsweb.cern.ch/record/1027034>.
- [103] L. Zhang et al., *Performance of the monitoring light source for the CMS lead tungstate crystal calorimeter*, *IEEE Trans. Nucl. Sci.* **52** (2005) 1123;
M. Anfreville et al., *Laser monitoring system for the CMS lead tungstate crystal calorimeter*, CMS-NOTE-2007-028, <http://cdsweb.cern.ch/record/1073694>.

- [104] A. Ghezzi et al., *Analysis of the response evolution of the CMS electromagnetic calorimeter under electron and pion irradiation*, CMS-NOTE-2006-038, <http://cdsweb.cern.ch/record/934066>.
- [105] P. Aspell et al., *Results from the 1999 beam test of a preshower prototype*, CMS-NOTE-2000-001, <http://cdsweb.cern.ch/record/687210>.
- [106] P. Adzic et al., *Reconstruction of the signal amplitude of the CMS electromagnetic calorimeter*, *Eur. Phys. J. C* **46** (2006) S1.23.
- [107] P. Adzic et al., *Energy resolution of the barrel of the CMS electromagnetic calorimeter*, 2007 *JINST* **2** P04004.
- [108] CMS collaboration, *The hadron calorimeter project: technical design report*, CERN-LHCC-97-031, <http://cdsweb.cern.ch/record/357153>.
- [109] P. Cushman, A. Heering and A. Ronzhin, *Custom HPD readout for the CMS HCAL*, *Nucl. Instrum. Meth. A* **442** (2000) 289.
- [110] A. Heister et al., *Measurement of jets with the CMS detector at the LHC*, CMS-NOTE-2006-036, <http://cdsweb.cern.ch/record/933705>.
- [111] H. Pi et al., *Measurement of missing transverse energy with the CMS detector at the LHC*, *Eur. Phys. J. C* **46** (2006) 45, CMS-NOTE-2006-035, <http://cdsweb.cern.ch/record/933706>.
- [112] S. Abdullin et al., *Design, performance, and calibration of CMS hadron-barrel calorimeter wedges*, *Eur. Phys. J. S5* (2008) 159, CMS-NOTE-2006-138, <http://cdsweb.cern.ch/record/1049915>.
- [113] V.I. Kryshkin and A.I. Ronzhin, *An optical fiber readout for scintillator calorimeters* *Nucl. Instrum. Meth. A* **247** (1986) 583.
- [114] M.G. Albrow et al., *A uranium scintillator calorimeter with plastic-fibre readout*, *Nucl. Instrum. Meth. A* **256** (1987) 23.
- [115] S. Banerjee and S. Banerjee, *Performance of hadron calorimeter with and without HO*, CMS-NOTE-1999-063, <http://cdsweb.cern.ch/record/687178>.
- [116] N. Akchurin and R. Wigmans, *Quartz fibers as active elements in detectors for particle physics*, *Rev. Sci. Instrum.* **74** (2002) 2955.
- [117] I. Dumanoglu et al., *Radiation-hardness studies of high OH⁻ content quartz fibers irradiated with 500 MeV electrons*, *Nucl. Instrum. Meth. A* **490** (2002) 444.
- [118] N. Akchurin et al., *Effects of radiation damage and their consequences for the performance of the forward calorimeters in the CMS experiment*, *Nucl. Instrum. Meth. B* **187** (2002) 66.
- [119] R. Thomas, *Study of radiation hardness of optical fibers*, M.Sc. Thesis, Texas Tech University, U.S.A. (2004).

- [120] A. Panagiotou et al., *CASTOR engineering design report*, CMS Note in preparation (2008).
- [121] X.N. Wang and M. Gyulassy, *HJING: a Monte Carlo model for multiple jet production in pp, pA and AA collisions*, *Phys. Rev. D* **44** (1991) 3501;
X.N. Wang, *A pQCD-based approach to parton production and equilibration in high-energy nuclear collisions*, *Phys. Rept.* **280** (1997) 287.
- [122] D. D'Enterria et al., *CMS physics technical design report: addendum on high density QCD with heavy ions*, *J. Phys. G* **34** (2007) 2307, CERN-LHCC-2007-009, <http://cdsweb.cern.ch/record/1019832>.
- [123] M. Albrow et al., *Prospects for diffractive and forward physics at the LHC*, CMS-NOTE-2007-002, CERN-LHCC-2006-039, <http://cdsweb.cern.ch/record/1005180>.
- [124] G. Mavromanolakis, *Quartz fiber calorimetry and calorimeters*, [physics/0412123v1](https://arxiv.org/abs/physics/0412123v1).
- [125] X. Aslanoglou et al., *First performance studies of a prototype for the CASTOR forward calorimeter at the CMS experiment*, [arXiv:0706.2576v3](https://arxiv.org/abs/0706.2576v3).
- [126] X. Aslanoglou et al., *Performance studies of prototype II for the CASTOR forward calorimeter at the CMS experiment*, *Eur. Phys. J. C* **52** (2007) 495 [[arXiv:0706.2641v2](https://arxiv.org/abs/0706.2641v2)].
- [127] A.S. Ayan et al., *CMS Zero-Degree-Calorimeter (ZDC). Technical design report*, in preparation.
- [128] O.A. Grachov et al., *Status of zero degree calorimeter for CMS experiment*, *AIP Conf. Proc.* **867** (2006) 258 [[nucl-ex/0608052](https://arxiv.org/abs/nucl-ex/0608052)].
- [129] E.H. Hoyer, W.C. Turner and N.V. Mokhov, *Absorbers for the high luminosity insertions of the LHC*, in *Proceedings of the 6th European Particle Accelerator Conference*, Stockholm Sweden (1998), <http://accelconf.web.cern.ch/AccelConf/e98/PAPERS/MOP13C.PDF>.
- [130] J.-F. Beche et al., *An ionization chamber shower detector for the LHC luminosity monitor*, *IEEE Nucl. Sci. Symp. Conf. Rec.* **1** (2000) 5.
- [131] O.A. Grachov et al., *Measuring photons and neutrons at zero degrees in CMS*, [nucl-ex/0703001](https://arxiv.org/abs/nucl-ex/0703001).
- [132] CMS collaboration, *The CMS muon project, technical design report*, CERN-LHCC-97-032, <http://cdsweb.cern.ch/record/343814>.
- [133] M. De Giorgi et al., *Design and simulations of the trigger electronics for the CMS muon barrel chambers*, *Proceedings of the first Workshop on Electronics for LHC Experiments*, Lisbon Portugal (1995), CERN-LHCC-95-56, <http://cdsweb.cern.ch/record/1062706>.
- [134] R. Veenhof, *Garfield. A drift chamber simulation program user's guide*, CERN Program Library W5050 (1994).

- [135] T. Zhao et al., *A study of electron drift velocity in Ar-CO₂ and Ar-CO₂-CF₄ gas mixtures*, *Nucl. Instrum. Meth. A* **340** (1994) 485.
- [136] A. Benvenuti et al., *Simulations in the development of the barrel muon chambers for the CMS detector at LHC*, *Nucl. Instrum. Meth. A* **405** (1998) 20.
- [137] CMS MUON group, G. Alampi et al., *Electrode strip deposition for the CMS barrel drift tube system*, CMS-NOTE-2006-144, <http://cdsweb.cern.ch/record/1000408>.
- [138] F. Gonella and M. Pegoraro, *A prototype frontend ASIC for the readout of the drift tubes of CMS barrel muon chambers*, in *4th Workshop on Electronics for LHC Experiments*, CERN-LHCC-98-036 page 257, <http://cdsweb.cern.ch/record/1062709>.
- [139] L. Barcellan et al., *Single events effects induced by heavy ions on the frontend ASIC developed for the muon DT chambers*, LNL Annual Report (2000) page 247, <http://cdsweb.cern.ch/record/1062712>.
- [140] C. Fernandez Bedoya et al., *Electronics for the CMS muon drift tube chambers: the read-out minicrate*, *IEEE Trans. Nucl. Sci.* **52** (2005) 944.
- [141] J. Christiansen et al., *A data driven high performance time to digital converter*, *Proceedings of the 6th Workshop on Electronics for LHC Experiments*, Cracow Poland (2000), CERN-2000-010 page 169, <http://cdsweb.cern.ch/record/478865>.
- [142] P. Moreira et al., *A radiation tolerant gigabit serializer for LHC data transmission*, *Proceedings of the 7th workshop on electronics for LHC experiments*, Stockholm Sweden (2001), CERN-2001-005 page 145, <http://cdsweb.cern.ch/record/588665>.
- [143] G. Dellacasa, V. Monaco and A. Staiano, *DDU: the front end driver system (FED) of the CMS drifttube detector*, *Nucl. Phys. B* **177-178** (Proc. Suppl.) (2008) 281, also in *Proceedings of hadron collider physics*, La Biodola, Isola d'Elba Italy (2007).
- [144] C. Albajar et al., *Test beam analysis of the first CMS drift tube muon chamber*, *Nucl. Instrum. Meth. A* **525** (2004) 465.
- [145] M. Aguilar-Benitez et al., *Study of magnetic field effects in drift tubes for the barrel muon chambers of the CMS detector at the LHC*, *Nucl. Instrum. Meth. A* **416** (1998) 243.
- [146] M. Aguilar-Benitez et al., *Construction and test of the final CMS barrel drift tube muon chamber prototype*, *Nucl. Instrum. Meth. A* **480** (2002) 658.
- [147] P. Arce et al., *Bunched beam test of the CMS drift tubes local muon trigger*, *Nucl. Instrum. Meth. A* **534** (2004) 441.
- [148] M. Aldaya et al., *Results of the first integration test of the CMS drift tubes muon trigger*, *Nucl. Instrum. Meth. A* **579** (2007) 951.
- [149] G. Charpak and F. Sauli, *High-accuracy, two-dimensional read-out in multiwire proportional chambers*, *Nucl. Instrum. Meth.* **113** (1973) 381.

- [150] C. Anderson et al., *Effect of gas composition on the performance of cathode strip chambers for the CMS endcap muon system*, CMS-NOTE-2004-033, <http://cdsweb.cern.ch/record/837542>.
- [151] T. Ferguson et al., *Anode front-end electronics for the cathode strip chambers of the CMS endcap muon detector*, *Nucl. Instrum. Meth. A* **539** (2005) 386.
- [152] R. Breedon et al., *Performance and radiation testing of a low-noise switched capacitor array for the CMS endcap muon system*, in *Proceedings of the 6th Workshop on Electronics for LHC Experiments*, CMS-CR-2000-013, <http://cdsweb.cern.ch/record/478866>.
- [153] M.M. Baarmand et al., *Spatial resolution attainable with cathode strip chambers at the trigger level*, *Nucl. Instrum. Meth. A* **425** (1999) 92.
- [154] V. Barashko, *Performance validation tests of the cathode strip chambers for CMS muon system*, *IEEE Nucl. Sci. Symp. Conf. Rec.* **2** (2005) 827.
- [155] E. Gatti et al., *Optimum geometry for strip cathodes on grids in MWPC for avalanche localization along the anode wires*, *Nucl. Instrum. Meth.* **163** (1979) 83.
- [156] D. Acosta et al., *Aging tests of full scale CMS muon cathode strip chambers*, *Nucl. Instrum. Meth. A* **515** (2003) 226.
- [157] L. Malter, *Thin film field emission*, *Phys. Rev.* **50** (1936) 48.
- [158] R. Breedon et al., *Results of radiation test of the cathode front-end board for CMS endcap muon chambers*, *Nucl. Instrum. Meth. A* **471** (2001) 340.
- [159] R. Santonico and R. Cardarelli, *Development of resistive plate counters*, *Nucl. Instrum. Meth.* **187** (1981) 377.
- [160] R. Cardarelli, A. Di Ciaccio and R. Santonico, *Performance of a resistive plate chamber operating with pure CF₃Br*, *Nucl. Instrum. Meth. A* **333** (1993) 399.
- [161] M. Abbrescia et al., *The simulation of resistive plate chambers in avalanche mode: charge spectra and efficiency*, *Nucl. Instrum. Meth. A* **431** (1999) 413.
- [162] M. Abbrescia et al., *Local and global performance of double-gap resistive plate chambers operated in avalanche mode*, *Nucl. Instrum. Meth. A* **434** (1999) 244.
- [163] M. Abbrescia et al., *Study of long term performance of CMS RPC under irradiation at the CERN GIF*, *Nucl. Instrum. Meth. A* **533** (2004) 102.
- [164] M. Abbrescia et al., *Neutron irradiation of the RPCs for the CMS experiment*, *Nucl. Instrum. Meth. A* **508** (2003) 120.
- [165] M. Abbrescia et al., *New developments on front-end electronics for the CMS resistive plate chambers*, *Nucl. Instrum. Meth. A* **456** (2000) 143.

- [166] M. Abbrescia et al., *Long term performance of double gap resistive plate chamber under gamma irradiation*, *Nucl. Instrum. Meth.* **A 477** (2002) 293.
- [167] M. Abbrescia et al., *Neutron induced single event upset on the RPC front-end chips for the CMS experiment*, *Nucl. Instrum. Meth.* **A 484** (2002) 494.
- [168] M. Abbrescia et al., *An RPC-based technical trigger for the CMS experiment*, in *Proceedings of the 12th Workshop on Electronics for LHC and Future Experiments*, Valencia Spain (2006), <http://cdsweb.cern.ch/record/1000404>.
- [169] G. Iaselli et al., *Properties of C₂H₂F₄-based gas mixture for avalanche mode operation of Resistive Plate Chambers*, *Nucl. Instrum. Meth.* **A 398** (1997) 173.
- [170] M. Abbrescia et al., *Gas analysis and monitoring systems for the RPC detector of CMS at LHC*, *IEEE Nucl. Sci. Symp. Conf. Rec.* **2** (2006) 891 [Frascati preprint LNF-06-34(P)].
- [171] M. Abbrescia et al., *HF production in CMS-resistive plate chambers*, *Nucl. Phys.* **B 158** (*Proc. Suppl.*) (2006) 30.
- [172] M. Abbrescia et al., *The bakelite for the RPCs of the experiment CMS*, *Nucl. Instrum. Meth.* **A 456** (2000) 132;
 M. Abbrescia et al., *Production and quality control of the Barrel RPC chambers of the CMS experiment*, *Nucl. Phys.* **B 150** (*Proc. Suppl.*) (2006) 290;
 M. Abbrescia et al., *Quality control tests for the CMS barrel RPCs*, *Nucl. Phys.* **B 158** (*Proc. Suppl.*) (2006) 73;
 A. Ball et al., *Cosmic ray certification of the first 100 CMS endcap RPCs and the corresponding construction database*, *Nucl. Phys.* **B 158** (*Proc. Suppl.*) (2006) 99;
 Z. Aftab et al., *Production and quality control for the CMS endcap RPCs*, *Nucl. Phys.* **B 158** (*Proc. Suppl.*) (2006) 16;
 Z. Aftab et al., *Assembly and quality certification for the first station of the endcap RPCs (RE1)*, *Nucl. Phys.* **B 158** (*Proc. Suppl.*) (2006) 103.
- [173] M. Abbrescia et al., *Resistive plate chambers performances at cosmic rays fluxes*, *Nucl. Instrum. Meth.* **A 359** (1995) 603.
- [174] M. Abbrescia et al., *Cosmic ray tests of double-gap resistive plate chambers for the CMS experiment*, *Nucl. Instrum. Meth.* **A 550** (2005) 116.
- [175] CMS, *CMS muon detector survey documents*, EDMS document CMS-00000083880, <https://edms.cern.ch/cedar/plsql/cms>.
- [176] C. Carneiro, R. Goudard and C. Humbertclaude, *CMS MAB prototype-deformation test under load and humidity-measurements from July to October 2002*, EDMS Doc. CMS-MA-UR-0001, <http://cdsweb.cern.ch/record/1062715>, also <https://edms.cern.ch/cedar/plsql/cms>.

- [177] G. Szekely et al., *Muon barrel alignment system based on a net of PC/104 board computers*, in *Proceedings of the 9th workshop on electronics for LHC experiments*, Amsterdam The Netherlands (2003), CERN-2003-006, <http://cdsweb.cern.ch/record/722098>.
- [178] M. Hohlmann et al., *Design and performance of the alignment system for the CMS muon endcaps*, *IEEE Nucl. Sci. Symp. Conf. Rec.* **1** (2006) 489;
R.H. Lee, *Simulation and study of the CMS Endcap Muon alignment scheme*, Ph.D. Thesis, Purdue University, U.S.A. (2002).
- [179] J. Moromisato et al., *The development of totally transparent position sensors*, *Nucl. Instrum. Meth. A* **538** (2005) 234.
- [180] M. Ripert, *Calibration of analog sensors for the alignment of muon chambers in the CMS experiment*, M.Sc. thesis, Florida Institute of Technology, U.S.A. (2005).
- [181] A. Calderón et al., *Large size high performance transparent amorphous silicon sensors for laser beam position detection*, *Nucl. Instrum. Meth. A* **565** (2006) 603.
- [182] A. Lopez Virto, *Caracterizacion y pruebas de validacion del sistema link de alineamiento de CMS*, Ph.D. Thesis, Universidad de Cantabria, Spain (2003).
- [183] A. Calderón, *Construccion, calibracion y evaluacion del sistema link de alineamiento del espectrometro de muones del experimento CMS*, PhD Thesis, Universidad de Cantabria, Spain (2006).
- [184] *ELMB Boards*, <http://elmb.web.cern.ch/ELMB/elmb128.html>.
- [185] P. Arce, *Object oriented software for simulation and reconstruction of big alignment systems*, *Nucl. Instrum. Meth. A* **502** (2003) 696.
- [186] D.E. Stewart and Z. Leyk, *Meschach library*, <http://www.netlib.org/c/meschach/readme>.
- [187] CMS collaboration, *The TriDAS project, technical design report. Volume 1: The level-1 trigger*, CERN-LHCC-2000-038, <http://cdsweb.cern.ch/record/706847>.
- [188] CMS collaboration, *The TriDAS project, technical design report. Volume 2: Data acquisition and high-level trigger technical design report*, CERN-LHCC-2002-026, <http://cdsweb.cern.ch/record/578006>.
- [189] CMS COLLABORATION group, W. Adam et al., *The CMS high level trigger*, *Eur. Phys. J. C* **46** (2005) 605 [[hep-ex/0512077](#)].
- [190] I. Magrans de Arbril, C.-E. Wulz and J. Varela, *Conceptual design of the CMS trigger supervisor*, *IEEE Trans. Nucl. Sci.* **53** (2006) 474.
- [191] P. Chumney et al., *Level-1 regional calorimeter trigger system for CMS*, in *Proceedings of Computing in High Energy Physics and Nuclear Physics*, La Jolla (2003), [hep-ex/0305047](#).

- [192] See <http://www.hep.ph.ic.ac.uk/cms/gct>.
- [193] See <http://www.picmg.org/v2internal/microTCA.htm>.
- [194] RD5 collaboration, F. Gasparini et al., *Bunch crossing identification at LHC using a mean-timer technique*, *Nucl. Instrum. Meth. A* **336** (1993) 91.
- [195] M. Andlinger et al., *Pattern Comparator Trigger (PACT) for the muon system of the CMS experiment*, *Nucl. Instrum. Meth. A* **370** (1996) 389.
- [196] C. Albajar et al., *Conceptual design of an improved CMS RPC muon trigger using the hadron outer scintillators*, *Nucl. Instrum. Meth. A* **545** (2005) 97.
- [197] J. Erö et al., *The CMS drift tube track finder*, CMS-NOTE-2008-009, <http://cdsweb.cern.ch/record/1103001>.
- [198] D. Acosta et al., *Performance of a pre-production track-finding processor for the level-1 trigger of the CMS endcap muon system*, in *Proceedings of the 10th Workshop on Electronics for LHC and Future Experiments*, Boston U.S.A. (2004), <http://cdsweb.cern.ch/record/814321>.
- [199] H. Sakulin et al., *Implementation and test of the first-level global muon trigger of the CMS experiment*, in *Proceedings of the 11th Workshop on Electronics for LHC and Future Experiments*, Heidelberg Germany (2005), <http://cdsweb.cern.ch/record/921035>.
- [200] C.-E. Wulz, *Concept of the first level global trigger for the CMS experiment at LHC*, *Nucl. Instrum. Meth. A* **473** (2001) 231.
- [201] A. Taurok, H. Bergauer and M. Padrta, *Implementation and synchronisation of the first level global trigger for the CMS experiment at LHC*, *Nucl. Instrum. Meth. A* **473** (2001) 243.
- [202] P. Glaser et al., *Design and development of a graphical setup software for the CMS global trigger*, *IEEE Trans. Nucl. Sci.* **53** (2006) 1282.
- [203] CMS TRIGGER and DATA ACQUISITION GROUP, *CMS L1 trigger control system*, CMS-NOTE-2002-033, <http://cdsweb.cern.ch/record/687458>.
- [204] B.G. Taylor, *Timing distribution at the LHC*, in *Proceedings of the 8th Workshop on Electronics for LHC and Future Experiments*, Colmar France (2002), <http://cdsweb.cern.ch/record/592719>.
- [205] T. Geralis et al., *The global trigger processor emulator system for the CMS experiment*, *IEEE Trans. Nucl. Sci.* **52** (2005) 1679.
- [206] E. Cano et al., *FED-kit design for CMS DAQ system*, *Proceedings of the 8th Workshop on Electronics for LHC Experiments*, Colmar France (2002), <http://cdsweb.cern.ch/record/594312>.
- [207] B.G. Taylor, *TTC distribution for LHC detectors*, *IEEE Trans. Nucl. Sci.* **45** (1998) 82, see, <http://www.cern.ch/TTC/intro.html>.

- [208] A. Racz, R. McLaren and E. van der Bij, *The S-Link64 bit extension specification: S-Link64*, <http://hs1.web.cern.ch/HSI/s-link>.
- [209] N.J. Boden et al., *Myrinet — A gigabit per second local area network*, *IEEE Micro* **15** (1995) 29.
- [210] G. Bauer et al., *The Tera-bit/s super-fragment builder and trigger throttling system for the Compact Muon Solenoid experiment at CERN*, *IEEE Trans. Nucl. Sci.* **55** (2008) 190, also in *15th IEEE Real Time Conference 2007*, Batavia U.S.A., CMS-CR-2007-020, <http://cdsweb.cern.ch/record/1046342>.
- [211] G. Bauer et al., *CMS DAQ event builder based on gigabit ethernet*, *IEEE Trans. Nucl. Sci.* **55** (2008) 198, also in *15th IEEE real time conference 2007*, Batavia U.S.A., CMS-CR-2007-016, <http://cdsweb.cern.ch/record/1046338>.
- [212] C.-D. Jones et al., *The new CMS data model and framework*, in *Proceedings of the Conference on Computing in High Energy Physics*, Mumbai India (2006).
- [213] QUATTOR is a system administration toolkit, <http://www.quattor.org> or <http://quattor.web.cern.ch>.
- [214] J. Gutleber and L. Orsini, *Software architecture for processing clusters based on I2O*, *Cluster Comput.* **5** (2002) 55.
- [215] V. Brigljevic et al., *Using XDAQ in application scenarios of the CMS experiment*, in *Proceedings of Computing in High Energy Physics*, La Jolla U.S.A. (2003), CMS-CR-2003-007, <http://cdsweb.cern.ch/record/687845>.
- [216] O. Nierstrasz, S. Gibbs and D. Tsichritzis, *Component-oriented software development*, *Comm. ACM* **35** (1992) 160.
- [217] D. Box et al., *Simple Object Access Protocol (SOAP)* 1.1, W3C Note 08, <http://www.w3.org/TR/SOAP>.
- [218] For the I2O standard, <http://developer.osdl.org/dev/opendoc/Online/Local/I2O/index.html>.
- [219] See <http://xdaqwiki.cern.ch>, and references therein.
- [220] R. Arcidiacono et al., *HyperDAQ — Where data acquisition meets the web*, in *10th ICAL-EPCS International Conference on Accelerator and Large Experimental Physics Control Systems*, Geneva Switzerland (2005), http://accelconf.web.cern.ch/AccelConf/ica05/proceedings/pdf/O5_004.pdf.
- [221] J. Boyer, *Canonical XML version 1.0*, W3C Recommendation, 16 August 2006, <http://www.w3c.org/XML>.
- [222] Apache Axis is an XML based Web service framework, <http://ws.apache.org/axis/>.
- [223] The Apache Tomcat servlet container, <http://tomcat.apache.org>.

- [224] *JCOP framework*, <http://itcobe.web.cern.ch/itcobe/Projects/Framework/welcome.html>.
- [225] OLE for Process Control (OPC), <http://www.opcfoundation.org/>.
- [226] R. Arcidiacono et al., *CMS DCS design concepts*, in *Proceedings of the 10th International Conference on Accelerator and Large Experimental Physics Control Systems (ICALEPCS2005)*, Geneva Switzerland (2005).
- [227] L. Fernandez-Hernando et al., *Development of a CVD diamond beam condition monitor for CMS at the Large Hadron Collider*, *Nucl. Instrum. Meth. A* **552** (2005) 183;
 A. Macpherson, *Beam condition monitoring and radiation damage concerns of the experiment*, in *Proceedings of the XV LHC Project Chamonix Workshop*, Divonne Switzerland (2006);
 D. Chong et al., *Validation of synthetic diamond for a beam condition monitor for the Compact Muon solenoid experiment*, *IEEE Trans. Nucl. Sci.* **54** (2007) 182.
- [228] R.J. Tapper, *Diamond detectors in particle physics*, *Rept. Prog. Phys.* **63** (2000) 1273.
- [229] R. Eusebi et al., *A diamond-based beam condition monitor for the CDF experiment*, *IEEE Trans. Nucl. Sci.* **2** (2006) 709.
- [230] M. Brunisma et al., *CVD diamonds in the BaBar radiation monitoring system*, *Nucl. Phys. B* **150** (*Proc. Suppl.*) (2006) 164.
- [231] W. de Boer et al., *Radiation hardness of diamond and silicon sensors compared*, *Phys. Status Solidi A* **204** (2007) 3004.
- [232] B. Dehning et al., *The beam loss monitoring system*, in *Proceedings of the XIII LHC Project Chamonix Workshop*, Chamonix France (2004), <http://cdsweb.cern.ch/record/726322>;
 E. Effinger et al., *The LHC beam loss monitoring system's data acquisition card*, in *Proceedings of LECC*, Valencia Spain (2006), <http://cdsweb.cern.ch/record/1027422>;
 C. Zamantzas et al., *The LHC beam loss monitoring system's surface building installation*, in *Proceedings of LECC*, Valencia Spain (2006), <http://cdsweb.cern.ch/record/1020105>.
- [233] C. Zamantzas, *The real-time data analysis and decision system for particle flux detection in the LHC accelerator at CERN*, Ph.D. Thesis, Brunel University, U.K., CERN-THESIS-2006-037, <http://cdsweb.cern.ch/record/976628>.
- [234] R. Schmidt et al., *Beam interlocks for LHC and SPS*, in *Proceedings of the International Conference on Accelerator and Large Experimental Physics Control Systems (ICALEPCS)*, Gyeongju South Korea (2003), CERN-AB-2003-106-CO, <http://cdsweb.cern.ch/record/693161>;
 B. Todd, *A beam interlock system for CERN high energy accelerators*, Ph.D. Thesis, Brunel University, U.K., CERN-THESIS-2007-019, <http://cdsweb.cern.ch/record/1019495>.
- [235] J. Kaplon and W. Dabrowski, *Fast CMOS binary front end for silicon strip detectors at LHC experiments*, *IEEE Trans. Nucl. Sci.* **52** (2005) 2713.