

References

Chapter 1

- [1.1] The LHC Conceptual Design Report - The Yellow Book CERN/AC/95-05 (LHC).
- [1.2] D. Denegri, “*Standard model physics at the LHC (pp collisions)*”, CERN-PPE/90-181 (1990) 56-117.
- [1.3] ALICE, Letter of Intent, CERN/LHCC 93-16, Geneva (1993).
- [1.4] CMS collaboration, CMS Technical Proposal. CERN/LHCC 94-38 (December 1994).
- [1.5] ATLAS Inner detector Technical Design Report, CERN/LHCC 97-17 (April 1997).
- [1.6] M. Hutinen, “*Radiation environment simulations for the CMS detector*”, CERN CMS/TN/95-198 (1995).
- [1.7] ROSE Collaboration Proposal, CERN/LHCC 96-23 (23 April 1996).
- [1.8] ROSE Collaboration, RD48 Status Report, CERN/LHCC 97-39 (20 June 1997).

Chapter 2

- [2.1] S.M. Sze, “*Physics of Semiconductor Devices*”, Second Edition, J. Wiley & Sons (1981).
- [2.2] D.A. Fraser, “*The physics of semiconductor devices*”, Oxford Physics series, 4th edition (1986).
- [2.3] M. Da Rold, “*High voltage devices for silicon detector operation in future high energy physics experiments*”, PhD thesis, Università di Padova, 28 February 1998.
- [2.4] W. von Ammon, H. Herzer, ”The production and availability of high resistivity silicon for detector application”, Nucl. Inst. and Meth. A226 (1984) 94-102.
- [2.5] A.J.R. de Kock, “*Crystal growth of bulk crystals: Purification, Doping and defects. Handbook on Semiconductor Vol 3: Material Properties and Preparation*”, Ed. S.P. Koller, North-Holland, Amsterdam (1980).
- [2.6] K.V. Ravi, “*Imperfections and Impurities in Semiconductor Silicon*”, Wiley-Interscience, J. Wiley & Sons, New York (1981).
- [2.7] Burger and Donovan, “*Fundamental of Silicon Integrated Device Technology*”, Vol. 1 Prentice-Hall INC (1967).

- [2.8] J. Kemmer, “Improvement of Detector Fabrication by the Planar Process”, Nucl. Inst. and Meth. A226 (1984) 89-93.
- [2.9] CANBERRA Semiconductor, Lemmerdries 25, 2250 Olen (B).
- [2.10] SINTEF Electronic and Cybernetics, Forskningsveie 1, P.B. 124, Blind, Oslo (N).
- [2.11] B. Sopko, “*Silicon Processing at Polovodice*”, Presentation at the 2nd ROSE workshop, CERN, February 1997.
- [2.12] A.G. Milnes, “*Deep impurities in Semiconductors*”, Wiley-Interscience, J. Wiley & Sons, New York (1973).
- [2.13] H.G. Grimmeiss “*Deep level impurities in semiconductors*”, Annual review of materials science, vol.7, p.341-76, Palo Alto, CA, USA, 1977
- [2.14] H. Feick, “*Radiation tolerance of Silicon Particle Detectors for High-Energy Physics Experiment*” PhD thesis, DESY F35D-97-08 (August 1997).
- [2.15] S.J. Bates et al. “*Proton irradiation of silicon detectors with different resistivities*”, IEEE Tr. On Nucl. Sci., 43-3 (1996), 1995.
- [2.16] S. Ramo IRE 27 (1939) 584.
- [2.17] Particle Data Group, Review of Particle Physics, Physical Review D, 1 July 1996.
- [2.18] C. Leroy et al., “*Study of charge collection and noise in non-irradiated and irradiated silicon detectors*”, Nucl. Inst. and Meth. A388 (1997) 289-296.

Chapter 3

- [3.1] H.E. Boesch and F.B. McLean, “*Hole transport and tapping in field oxides*”, IEEE Trans. Nucl. Sci. Vol. NS-32 N° 6 (1985) 3940.
- [3.2] A.J. Van Lint, “*The physics of radiation damage in particle detectors*”, Nucl. Inst. and Meth. A253 (1987) 453-459.
- [3.3] H.E. Boesch and T.L. Taylor, “*Charge and interface state generation in field oxides*”, IEEE Trans. Nucl. Sci. Vol. NS-31 N° 6 (1984) 1273.
- [3.4] G. Kinchin and S. Pease Rep. Prog. Phys. Vol 18 (1955).
- [3.5] J. Lindhard et al. Kgl. Danske Videnskab. Mat. Fys. Medd. Vol 33 n° 10(10\960).
- [3.6] K. Gill et al. “*Bulk damage effects in irradiated silicon detectors due to clustered divacancies*”, J. Appl. Phys. 82 (1), July 1997.

- [3.7] G. Mueller et al. IEEE Tr. Nucl. Sci. Vol 29 1493 (1982); V. Van Lint et al. IEEE Tr. Nucl. Sci. Vol 19, 181(1972).
- [3.8] J.W. Corbett, G.D. Watkins, “*Production of divancancies and vacancies by electron irradiation of silicon*” Phys. Rev. A138 (1965) 555-560.
- [3.9] B. McEvoy, “*Defect kinetics in silicon detector material for applications at the Large Hadron Collider*”, PhD thesis, Imperial College, London, November 1996.
- [3.10] B. McEvoy, “*Defect kinetics modelling a brief revue and some interesting new result*”, 3rd ROSE workshop, DESY, Hamburg, 12-14 February 1998, DESY-Proc. 1998-02.
- [3.11] G. Watkins and J. Corbett. Phys. Rev. 138, A543 (1965).
- [3.12] B. Svennson and J. Lindstrom, J. Appl. Phys. Vol 72, No 12, 5616 (1992).
- [3.13] S.L. Gunn et al., “*Neutron Transmutation Doping in Semiconductors*”, Ed. J.M. Meese, Plenum Press, New York, (1978).
- [3.14] G. Summers et al. IEEE Trans. Nucl. Sci., Vol. 34, 1134 (1987).
- [3.15] A. Van Ginneken, “*Non ionising Energy deposition in Silicon for Radiation Damage Studies*”, Fermilab National Accelerator Laboratory FN-522 (October 1989).
- [3.16] A. Vasilescu, “*Fluence normalisation based on the NIEL scaling hypothesis*”, 3rd ROSE workshop, DESY, Hamburg, 12-14 February 1998, DESY-Proc. 1998-02.
- [3.17] K. Gill et al., “*Radiation damage by neutrons and photons to silicon detectors*”, Nucl. Inst. and Meth. A322 (1992) 177-188.
- [3.18] E. Barberis et al., “*Temperature effects on radiation damage to silicon detectors*”, Nucl. Inst. and Meth. A326 (1993) 373-380.
- [3.19] A. Chilingarov et al., “*Radiation studies and operational projections for silicon in the Atlas inner detector*”, Nucl. Inst. and Meth. A360 (1995) 432-437.
- [3.20] F. Lemeilleur et al., “*Study of characteristic of silicon detectors irradiated with 24 GeV/c protons between -20°C and +20°C*”, Nucl. Inst. and Meth. A360 (1995) 438-444.
- [3.21] E. Barberis et al., “*Radiation damage in silicon detectors – Self annealing corrections*”, SITP-Internal Note, SITP-002 (1991).
- [3.22] G. Hall et al., “*Neutron radiation damage studies of silicon detectors – Summary of recent results*”, Imperial College internal note, IC/HEP/91/1 (1991).

- [3.23] R. Wunstorf, ”*Systematische Untersuchungen zur Strahlenresistenz von Silizium-Detektoren für die Verwendung in Hochenergiephysik-Experimenten*”, PhD thesis, Hamburg University(1992) see also DESY FH1K-92-01 (1992)
- [3.24] E.H.M. Heijne CERN Report 83-06 (1983).
- [3.25] I. Konozenko et al. “Radiation defects in silicon of high purity”, Radiation Effects in Semiconductors, Ed. J. Corbett, G. Watkins, Gordon and Breach, New York (1971), 294-255.
- [3.26] F. Lemeilleur et al. Conference Proc. Od 1st International Conference On Large Scale Applications and Radiation Hardness of Semiconductor Detectors, 167-180, Firenze, 7-9 July 1993.
- [3.27] E. Fretwurst et al., “*Radiation hardness of silicon detectors for future colliders*”, Nucl. Inst. and Meth. A326 (1993) 357-364.
- [3.28] E. Fretwurst et al., “Reverse annealing of the effective impurity concentration and long term operational scenario *for silicon detectors in future collider experiments*”, Nucl. Inst. and Meth. A342 (1994) 119-125.
- [3.29] M. Moll et al. “*Correlation between a deep hole trap and the reverse annealing effect in neutron-irradiated silicon detectors*”, presented at the 7th Pisa meeting on Advanced Detectors, La Biodola, Isola d’Elba, Italy, May, 25-31 1997 to be published on NIMA.
- [3.30] Z.Li “*Experimental comparison among various models for the reverse annealing of the effective doping concentration of ionized space charges (N_{eff}) of neutron irradiated silicon detectors*”, IEEE Trans. Nucl. Sci. 42 (1995), 224.
- [3.31] F. Cavallari et al., “Radiation damage effect on avalanche Photodiodes”, CMS Conference Report, CMS CR 1998-010, presented at the 2nd Intern. Conf. On Radiation Effects on Semiconductor Materials, Detectors and Devices, March 4-6, 1998, Firenze, Italy.
- [3.32] E. Borchini et al., “*Modelling macroscopic characteristics of irradiated silicon with deep centres*”, 2nd Intern. Conf. On Large Scale Applications and Radiation Hardness of Semiconductor Detectors, Florence, Italy, 28-30 June 1995, to be published in NIM A.

- [3.33] V. Palmieri et al. “*Evidence for charge collection efficiency recovery in heavily irradiated silicon detectors operated at cryogenic temperatures*”, Preprint Bern BUHE-98-06.

Chapter 4

- [4.1] D.P Kennedy, I.C. Morley and W. Kleinfelder, “*On the measurement of impurity atom distribution in silicon by the differential capacitance technique*”, IBM Jour. Res. Devel., 12(399), September 1968.
- [4.2] D.P Kennedy and P.R. O’Brien, “*On the measurement of impurity atom distribution in silicon by the differential capacitance technique*”, IBM Jour. Res. Devel., 13(212), September 1968.
- [4.3] D.J. Bartelink, “*Limits of applicability of the depletion approximation and its recent augmentation*”, Appl. Phys. Lett. 38 (6), 15 March 1981(461).
- [4.4] L.C. Kimerling, “*Influence of deep traps in the measurement of free-carriers distributions in semiconductor by junction capacitance techniques*”, Jour. Appl. Phys. Vol. 45 n° 4(1839). April 1974.
- [4.5] S. Bates, “*The effects of Proton and Neutron Irradiations on Silicon Detectors for the LHC*”, PhD thesis, Cambridge University, December 1993.
- [4.6] Z. Li and H.W. Kraner, “*Studies of frequency dependent C-V characteristics of neutron irradiated p+-n silicon detectors*”, IEEE Trans. Nucl. Scie., Vol. 38(244), n° 2, April 1991.
- [4.7] L. Landau, J. Phys. USSR 8 (1944) 201.
- [4.8] Particle Data Group, Review of Particle Physics Phys. Rev D Partcles and Fields, Vol. 54 N. 1 (1996).
- [4.9] C.F. Williamson, J.P Boujot and J. Picard CEA-R-3042 (July 1966).
- [4.10] F. Ziegler, J. P. Biersack and U. Littmark, “*The Stopping and Range of Ions in Solids*”, Pergamon Press, New York, 1985.
- [4.11] D. K. Schroder, “*Semiconductor Material and Device Characterisation*”, Wiley-Interscience, J. Wiley & Sons, New York (1990).
- [4.12] E.H.M. Heijne, CERN83-06.

- [4.13] R.H. Kingston, “*Switching time in Junction Diodes and Junction Transistors*”, Proc. IRE 42, 829-834, May 1954.
- [4.14] R. Bates et al., “*Measurement of high-intensity proton-beam profile with a GaAs SIU surface barrier detector*”, Nuclear Instruments and Methods in Physics Research A 395 (1997) 26-28, North-Holland, Amsterdam.
- [4.15] E. León-Florián, C. Leroy and C. Furetta, “*Particle fluence measurements by activation technique for radiation damage*”, CERN-ECP/95-15.
- [4.16] General Atomic, “*TRIGA Mark II reactor description*”, J. J. Hopkins Laboratory for Pure and Applied Science, S. Diego, California, GA-568, 2 September 1959.
- [4.17] M. Moll et al. “*Leakage current of hadron irradiated silicon detectors – Material dependence*”, 2nd Intern. Conf. On Large Scale Applications and Radiation Hardness of Semiconductor Detectors, Florence, Italy, 28-30 June 1995, to be published in NIM A.

Chapter 5

- [5.1] B. Dezillie et al., “*Radiation hardness of silicon detectors manufactured on wafers from various sources*”, Nuclear Instruments and Methods in Physics Research A 388 (1997) 314-317, North-Holland, Amsterdam.
- [5.2] B. Dezillie et al., “*Experimental results on radiation induced bulk damage effects in float-zone and epitaxial silicon detectors*”, Nuclear Instruments and Methods in Physics Research A 388 (1997) 314-317, North-Holland, Amsterdam.
- [5.3] B.G. Svensson, J.L. Lidström, “*Generation of divacancies in silicon by MeV electrons: Dose rate dependence and influence of Sn and P*”, J. Appl. Phys. 72 (1992) 5616-5621.
- [5.4] H. Feick et al., “*Correlation of Radiation Damage Effects in High Resistivity Silicon Detectors with Results from Deep Level Spectroscopy*”, presented at IEEE 1996 Nuclear Sci. Symposium & Medical Imaging Conference, Anaheim, California, November 2-9, 1996.
- [5.5] B.C. McEvoy, “*Investigations using a simple model for defect kinetics in silicon*”, CERN-RD20 TN/95-41, 2nd April, 1995.
- [5.6] S.J. Watts, “*Irradiation induced defects in silicon detectors*”, presented to the 192nd Meeting of the Electrochemical Society, Inc., Paris, August 31-September 5, 1997.

- [5.7] Z. Su et al., “Determination of oxygen in silicon by ratio of A center to E center”, J. Appl. Phys. 67 (1990) 1903-1906 .
- [5.8] G.S. Oehrlein et al., J. Appl. Phys. 54 (1), January 1983.
- [5.9] Department of Solid State Sciences, University of Gent, Krijgslaan 281, B-900 Gent, Belgium.
- [5.10] Prague Czech Technical University (CTU), Brehova 7, 11519 Prague 1 (CZ).
- [5.11] ITME, Institute of Electronic Materials Technology, ul. Wólczynska 133, D1-919 Warsaw (PL).
- [5.12] EVANS EUROPA, Brunel University, Uxbridge, Middlesex UB8 3PH, United Kingdom.
- [5.13] Properties of silicon, INSPEC, The Institution of electrical Engineers, London and New York, 1998.
- [5.14] C. Kim et al., “*High resistivity n-type silicon detectors produced by neutron transmutation doping*”, IEEE Trans. Nucl. Sci., NS 26-1(1979), 292
- [5.15] WACKER Chemitronic, Burghausen, Germany.
- [5.16] POLOVODICE, Vovodvorská 994, 142 21 Praha 4 (CZ).
- [5.17] MACOM, <http://www.macom.com>.
- [5.18] ITE, Institute of Electronic Materials Technology Al. Lotników 32/46, 02-688 Warsaw (PL).
- [5.19] E. Nossarzevska-Orlowska, “Characterisation of ITME-silicon for detectors”, 3rd ROSE workshop, DESY-Proceedings-1998-02, February 1998.
- [5.20] S.M. Sze and J.C. Irvin, “Resitivity, Mobility and Impurity Levels in GaAs, Ge and Si at 300 K”, Solid State Electron., 11, 599 (1968).
- [5.21] DIOTEC, Družstevná ul. č 109 SK-95605 Radošina (SK).
- [5.22] G. Weyer et al.,” *Annealing behavior of high concentration of SN and Sb implanted in silicon.*”, 14th International Conference on Defects in Semiconductors, Paris, France, 18-22 Aug. 1986. In: Materials-Science-Forum (Switzerland), vol.10-12, pt.3, p.1135-40, 1986

Chapter 6

- [6.1] Charles University Van de Graaf Accelerator, Holešovickách 2, CZ-180 00, Praha 8, CZ
- [6.2] V. Cindro et al., “*Preliminary results from the neutron irradiation at the Ljubljana reactor facilities*”, 3rd ROSE workshop, DESY-Proceedings-1998-02, February 1998.
- [6.3] M. Moll, “*Influence of the oxygen concentration on the radiation hardness of silicon detectors*”, 3rd ROSE workshop, DESY, Hamburg, 12-14 February 1998, DESY-Proc. 1998-02.

Chapter 7

- [7.1] V. Eremin et al., “Development of transient current and charge techniques for the measurement of effective net concentration of ionized charges (Neff) in the space charge region of p-n junction detectors”, Nuclear Instruments and Methods in Physics Research A 372 (1996) 388-398, North-Holland, Amsterdam.
- [7.2] S. Pospišil, G. Casse et al., “Charge collection efficiency of silicon detectors measured with heavy charged particles”, 3rd ROSE workshop, DESY, Hamburg, 12-14 February 1998, DESY-Proc. 1998-02.
- [7.3] L.J. Beattie et al., ATLAS note INDET-N^o 194, 10 December 1997
- [7.4] C. Leroy et al., proceedings of 2nd International Conference on Radiation Effects on Semiconductor Materials, Detectors and Devices, Firenze, Italy, March 4-6 1998 to be published in Nucl. Instr. and Meth.
- [7.5] Facoltà d'Ingegneria - Istituto di Elettronica, via G.Duranti, 93 - 06125 Perugia – Italy.
- [7.6] D. Passeri, private communication.
- [7.7] D. Passeri, private communication.
- [7.8] D. Passeri et al. TCAD-Based Analysis of Radiation-Hardness in Silicon Detectors. IEEE-tns n 45 vol 3 June 1998.

