Glossary

ADC	*Analog-to-Digital Converter* Electronic circuit that converts an analog voltage or current to a digital value
ALICE	*A Large Ion Collider Experiment* The Large Hadronic Collider detector dedicated to heavy ion studies
ASIC	*Application Specific Integrated Circuit* Integrated circuit with functionalities customized for a specific application
ATLAS	*A Toroidal Lhc ApparatuS* One of the large multi purpose experiments at the CERN LHC
BCB	*Benzocyclobutene* A dielectric polymer with very good film-forming properties
BTeV	*Beauty at TeVatron* The Tevatron detector dedicated to beauty particles studies Its construction was stopped in 2005
CCD	*Charged Coupled Device* Pixelated charge integrating device in which the charge is shifted from one pixel to the next to an output node
CDS	*Correlated Double Sampling* Readout technique in which double samples are taken and subtracted from each other
CERN	*European Organization for Nuclear Research* The world's largest particle physics laboratory located near Geneva, Switzerland
CFRP	*Carbon Fiber Reinforced Polymers* A composite made of carbon fiber molded with an epoxy resin and then cured
CME	*Linear Coefficient of Moisture Expansion* The fractional length change per unit mass variation due to the moisture desorption or absorption

CMOS	*Complementary Metal Oxid Semiconductor* Electronic circuit using both ("complementary") types of field effect transistors, NMOS and PMOS
CMS	*Compact Muon Solenoid* One of the large multi purpose experiments at the CERN LHC
CTE	*Linear Coefficient of Thermal Expansion* The fractional length change per degree of temperature increase
CVD	*Chemical wafer deposition* Process of depositing thin layers of dielectrics on a wafer from the gas phase
CZ process	*Czochralski process* Process of pulling a single crystal out of a melt. Named after its inventor Jan Czochralski (1885–1953)
DAC	*Digital-to-Analog Converter* Electronic circuit that converts a digital value to an analog voltage or current
DELPHI	*DEtector for Lepton, Photon and Hadron Interactions* CERN collider experiment dedicated to the study of the mediators of the weak interaction
DEPFET	*Depleted Field Effect Transistor* Pixel sensor with an implanted transistor in every pixel cell
Die	Unpackaged electronics chip
DOFZ material	*Diffusion Oxygenated Float Zone Material* Float zone silicon enriched with oxygen, by growing a thick oxide layer on the wafer surface and heating the wafer under inert atmosphere above 1000°C for more than 24 h. This material has shown to be more radiation-hard then standard float zone silicon
DSM	*Deep Submicron Technology* Semiconductor technologies with gate lengths $\lesssim 0.25\,\mu\text{m}$
ENC	*Equivalent Noise Charge* Root mean square noise at the output of a charge-sensitive amplifier normalized to the signal of a single electron input charge, i.e. the noise of an amplifier "in units of electrons"
EoC logic	*End of Column Logic* Part of the pixel front-end chip dedicated to data storage and input/output
ESRF	*European Synchrotron Radiation Facility* Synchrotron Radiation Laboratory in Grenoble, France

Eutectic	Mixture of two or more elements which has a lower melting point than any of its constituents
eV	*Electronvolt* Energy gained by an unbound electron falling through an electrostatic potential difference of 1 volt
FADC	*Flash Analog to Digital Converter* Fast ADC architecture. The analog input is simultaneously compared to many reference values
FE	*Front End* ASIC that reads out a matrix of pixel sensors
FET	*Field Effect Transistor* Electronic component in which the current between two terminals (source and drain) is steered by the potential of a third terminal (gate)
Fluence	Integral of a particle flux over a period of time
FNAL	*Fermi National Accelerator Laboratory* Particle physics laboratory near Chicago dedicated to the memory of the Italian physicist Enrico Fermi (1901–1954)
FZ process	*Float Zone Process* Process of producing a single crystal by partly melting a polycrystalline rod
HAPS	*Hybrid Active Pixel Sensors* Hybrid pixel technology using interleaved pixels with capacitive charge division
IC	*Integrated Circuit* Electronics circuit integrated on a chip
LEP	*Large Electron Positron Collider* Electron–Positron collider at CERN, Switzerland
LHC	*Large Hadronic Collider* Proton–proton collider at CERN, Switzerland
LSF	*Line Spread Function* Image of a line source object of unit intensity
LVDS	*Low Voltage Differential Signals* A standard in fast low power data transmission based on sending a low voltage ($\approx$350 mV) logic signal over a twisted pair cable
MAPS	*Monolithic Active Pixel Sensor* CMOS pixel detector

MCC	*Module Control Chip* ASIC that controls the input and output of data and performs event building in an ATLAS pixel module
MCM-D	*Multichip Module by Deposition* In this context: Module structure with additional conductive layers deposited on the sensor so that no extra printed circuit board is required
MEDIPIX	*Medical Pixel Chip* Pixel readout chip for medical imaging
MEMS	*Micro-Electro-Mechanical Systems* Small scale electromechanical technology
MIMOSA	*Minimum Ionizing Monolithic Sensor Array* CMOS pixel detector, special version of a MAPS detector
MIP	*Minimum Ionizing Particle* The energy deposited by an ionizing particle when passing through material depends, among other things, on its velocity. The energy loss increases for very slow and very fast particles and has a broad minimum. Particles with energy loss in this minimum are defined minimum ionizing particles.
MOSFET	*Metal-Oxide Semiconductor Field-Effect Transistor* Field effect transistor with isolated metal gate. Today, most FETs have polysilicon gates, but they are still often called MOSFET
MPEC	*Multipicture Element Counter* X-ray counting pixel chip
MTF	*Modulation Transfer Function* Ratio of image contrast to object contrast for a given spatial frequency
Multiple scattering	Change in direction of a charged particle track when traversing a medium primarily due to Coulomb scattering from nuclei
NIEL	*Nonionizing Energy Loss* Part of the absorbed energy which is not used for ionization but, e.g., for displacing lattice atoms. It was believed that radiation damage scales with the NIEL independently of the type of radiation an assumption which has not shown to be correct
OmegaD	*Pixel front-end chip used in experiment WA94 and WA97* One of the first front-end chip for reading out pixel matrices
PILATUS	*PixeL ApparaTUs for the SLS* Counting pixel detector for SLS synchrotron radiation beam lines at the Paul-Scherrer Institute, Switzerland

Pseudorapidity	Kinematical variable of a relativistic particle defined as $\eta = -\ln\tan(\theta/2)$, where θ is the particle zenith angle referenced to the direction of the crossing beams
PSF	*Point Spread Function* Image of a point source object of unit intensity
PSI	*Paul Scherrer Institute* Swiss multidisciplinary research center for natural sciences and technology, Villigen, Switzerland
PUC	*Pixel Unit Cell* Circuit block on the readout chip that is repeated for every pixel
RD19	CERN R&D experiment dedicated to the development of pixel detectors to be used at high luminosity colliders
SEU	*Single Event Upset* The flipping of a stored bit in an integrated circuit due to charge deposition by an ionizing particle
SLS	*Swiss Light Source* Swiss Synchrotron Radiation Facility at the Paul-Scherrer Institute, Switzerland
SOI	*Silicon on Insulator* Substrate type with a buried oxide layer to separate the "active" silicon from the substrate.
SPICE	*Simulation Program with IC Emphasis* Widely used software for the simulation of analog circuits
SSC	*Superconducting Super Collider* Particle accelerator planned for very high energy physics measurements in the United States. Its construction was stopped in 1994
Stoichiometry	Study of the proportion of elements that take part in chemical reactions
TBM	*Token Bit Manager* ASIC that controls the input and output of data of a CMS pixel module
Terabit	Unit of information storage corresponding to 10^{12} bits
Tevatron	Proton-Antiproton collider accelerator with the highest energy available today. It is located at FNAL, Batavia, Illinois, USA
Time walk	Time dispersion of a discriminated pulse due to the combined effect of the pulse heights spread and the single threshold discrimination

ToT	*Time over Threshold* Method to determine the amplitude of an analog signal. The signal is compared to a threshold and the duration of the output pulse is measured. ToT is often nonlinear
Trigger	Set of conditions that, once satisfied, select the event for further analysis
UBM	*Under Bump Metallization* Metal layer sequence under a solder bump
USB	*Universal Serial Bus* Popular serial interconnect to PCs
VLSI	*Very Large Scale Integration* Large scale integration technology of electronics circuits on silicon
W boson	Charged mediator of the weak nuclear interaction
WA92	CERN fixed target experiment dedicated to the study of particles containing heavy quarks
WA94	CERN fixed target experiment dedicated to the study of heavy ions collisions
WA97	CERN fixed target experiment dedicated to the study of heavy ions collisions
X_0	*Radiation length* Mean distance over which a high-energy electron looses all but $1/e$ of its energy by bremsstrahlung
XPAD	*X-ray Pixel Advanced Detector* Counting pixel detector for ESRF synchrotron radiation beam lines, Grenoble, France
Young's modulus	Measure of the stiffness of a given material (also called elasticity modulus)

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Index

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