



Università degli Studi di Pavia

FACOLTÀ DI SCIENZE MATEMATICHE, FISICHE, NATURALI
Corso di laurea in Scienze Fisiche

Fotorivelatori Criogenici per la rivelazione di eventi rari in fisica delle alte energie

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Introduction

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Capitolo 1

Future $e^+ e^-$ colliders

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1.1 Physics goals

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1.2 Leptonic colliders

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1.3 Detectors

Capitolo 2

Calorimetry and dual-readout

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2.1 Electromagnetic showers

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2.1.1 Shower development

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2.1.2 Energy resolution

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2.2 Hadronic showers

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2.3 Dual-readout calorimetry

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2.3.1 Working principles

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2.3.2 Experiments

Capitolo 3

Silicon Photomultipliers

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3.1 Working principles

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3.2 SiPM Response

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3.3 Noise effects

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3.3.1 Dark Count Rate

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3.3.2 After-Pulse

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3.3.3 Optical Cross-Talk

Capitolo 4

IDEA DR calorimeter project

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Capitolo 5

IDEA DR calorimeter full simulation

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5.1 Simulation performances

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5.1.1 Different configurations

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5.1.2 Time studies

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5.1.3 Saturation effect

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Occupancy effect and Energy loss

Studies of the occupancy effect are important preliminary studies that give knowledge about the information loss in the detection process.

5.1.4 Digitization impact on energy resolution

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5.2 Neural Network: Particle ID on waveform

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5.2.1 Configuration

aaa

5.2.2 Performances

aaa

5.3 Neural Network: Particle ID on imaging

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5.3.1 Configuration

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5.3.2 Performances

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Capitolo 6

Conclusion

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Thanks

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Bibliografia

- [1] Y. Fukuda et al., Phys. Rev. Lett. 81 (1998) 1158-1162.