

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

Candidato Alessandro Villa Matricola 462495 Supervisore

Dott. Andrea Negri

Co-Supervisori

Dott. Roberto Ferrari Dott. Lorenzo Pezzotti

Indice

In	trodi	uction		iii		
1	Futi	ure e^+	e^- colliders	1		
2	Calorimetry and dual-readout					
	2.1	Electo	omagnetic showers	. 3		
		2.1.1	Shower development	. 3		
		2.1.2	Energy resolution	. 3		
	2.2	Hadro	onic showers			
		2.2.1	Shower development			
		2.2.2	Energy resolution			
	2.3	Dual-r	readout calorimetry			
		2.3.1	Working principles			
		2.3.2	Experiments			
3	Silic	on Ph	notomultipliers	5		
•	3.1		ng principles			
	3.2		effects			
	0.2	3.2.1	Dark Count Rate			
		3.2.1	After-Pulse			
		3.2.2	Optical Cross-Talk			
4	IDE	A pro	ject and simulation	7		
5	Sim	ulation	n results	9		
6	Con	clusio	n	11		
Tł	nanks	5		13		
Bi	bliog	raphy		15		

Introduction

Future e^+ e^- colliders

Calorimetry and dual-readout

aaa

2.1 Electomagnetic showers

aaa

2.1.1 Shower development

aaa

2.1.2 Energy resolution

aaa

2.2 Hadronic showers

aaa

2.2.1 Shower development

aaa

2.2.2 Energy resolution

aaa

2.3 Dual-readout calorimetry

2.3.1 Working principles

aaa

2.3.2 Experiments

Silicon Photomultipliers

aaa

3.1 Working principles

aaa

3.2 Noise effects

aaa

3.2.1 Dark Count Rate

aaa

3.2.2 After-Pulse

aaa

3.2.3 Optical Cross-Talk

IDEA project and simulation

Simulation results

Conclusion

Thanks

14 THANKS

Bibliografia

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