

The Discovery of the Lazarus Effect

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How to verify the idea?

- Collect silicon detectors dead by radiation:
plenty available...
- No experts \Rightarrow look at charge signal from
minimum ionising particles...
- Use low noise HSPD set-up to measure the
samples at low temperature

How the story began ?

- Work in LHEP-Bern on the Hybrid Superconducting Pixel Detector
V. Palmieri and A. Esposito, NIM A 396 (1997) 277-280

- Looking for a sensor to couple to the infinite radiation hard superconductive electronics: CVD, GaAs, Si...

- Diamond: de-trapping suppressed because of large band-gap. But...

$$\text{de-trapping} \propto \exp(E_{\text{trap}}/kT)$$

⇒ Si has a smaller band-gap, then **reduce the temperature !**

- HSPD is at 4.2K...

BINGO !!!



proviamo l'altro modo non irradiato, 57D15 @ 300K

	V 150	50mA	
free running	"	RD15 01. DAT	peak @ 145
CALIBRATION (test)		02	" @ 140
frappesed	150V	03	" @ 230

56D25 IRRADIATO

immerso in He alle 19:20 per osservare il pumping (eventuale) - Applichiamo $V_{bias} = 100V$

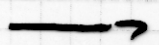
alle 20:37 $T = 7143 \Omega$

Attiviamo la sorgente.

I_{leak}	V		
1 mA	150V	HD2501. dat	peak @ 73 ch
	"		
550pA	"	HD2502. dat	after 12 hours S3

1B-3
 It seems that there is a connection between leakage current and CCE - we try to increase the leakage current artificially

1 mA	250	03	ch 80
0.55 nA	150	04	ch 53
0.89 nA	150	05	ch 67
0.92 nA	150	06	ch 73



Programma di misure -

1) condizioni di misure

misure della leakage durante prese dati

- tamper detector operate ~~3 min~~ stabile
- 3 min dopo Vsett
- DViq 50, 100, 150, 200, 250
- leakage current alla fine delle misure con sepo

alla fine del set di misure
 si misura a 0V

- in He 1h stabilizzazione
- N
- CO2 } finché non 2. stabilizza
- } demando

TABELLA

VALORI

57 - DIS (non-irradiated)

	<u>LHe</u>	<u>LN₂</u>	<u>SCO₂</u>
50	163	171	172
100	163	180	182
150	163	180	182

200

56 - D25 (1.2×10^{15} n/cm²)

	<u>LHe</u>	%	<u>LN₂</u>	%	<u>SCO₂</u>	%
50	-	0	77	45	-	0
100	77	47	94	52	-	0
150	88	54	103	57	-	0
200	96	59	113	63	-	0
250	100	61	113	63	-	0

732 - 5

LHe

-50	142
-100	142
-150	142
-200	

732 - 25

LH₂

-50	60	42
-100	77	54
-150	86	60
-200	86	60

50 - D20

LHe

%

LN₂

%

SCO₂

%

50	-		73	43	
100	72	44	90	50	
150	82	50	100	55	
200	90	55	105	58	
250	90	55	105	58	

