Status of „Technotest" sub project (RD-50)

by

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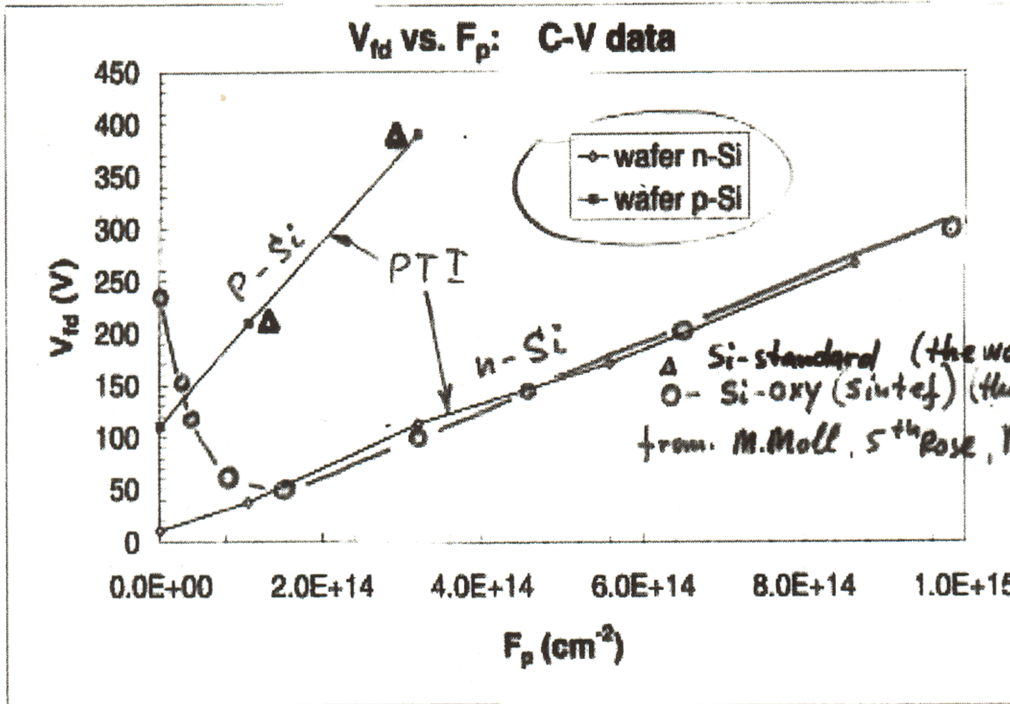
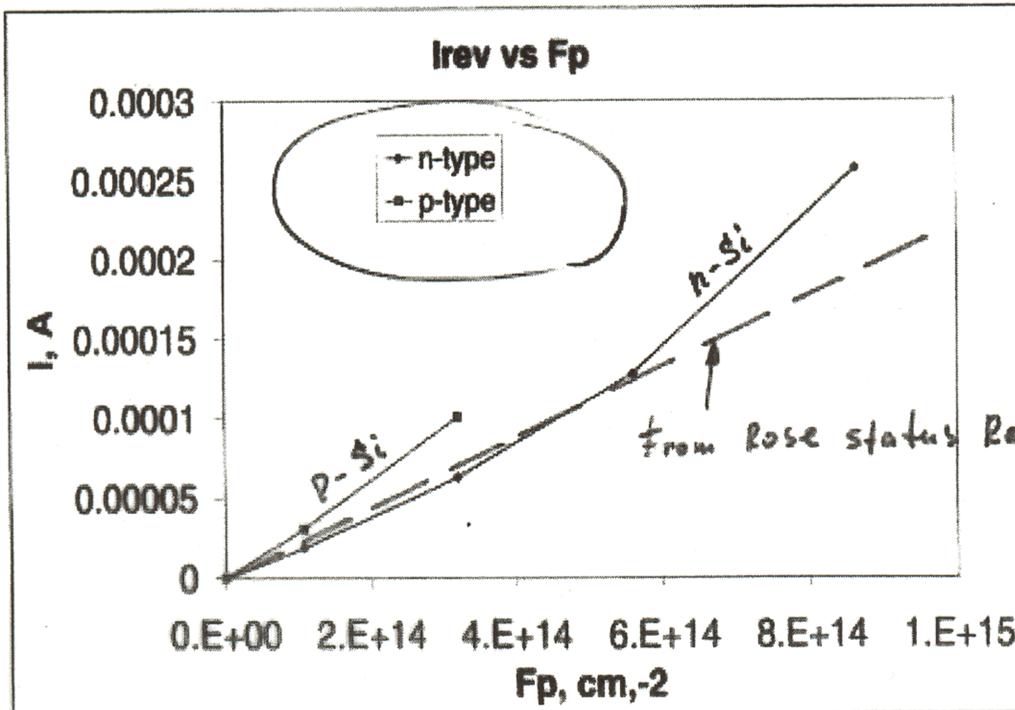
RD50 meeting
CERN
May 5. 2004

V_{fd} and I_r degradation with φ_p





V. Eremin, RD50, May 19.03

V. Eremin, RD50, 05.05.04

Subproject: TECHNOTEST

Participants

Physico - Technical Institute, St. Petersburg, Russia (PTI)
Helsinki Institute of Physics, Helsinki, Finland (HIP)
Brookhaven National Laboratory, New York, USA (BNL)
Stefan Josef University, Lubljana, Slovenia (SJU)
ITEP, Russia
CERN

Materials

	Material						Processed test detectors, pcs.		
Participants	producer	type	resistivity	orientation	wafers, pcs.	wafer source	pad	strip	pixel
PTI	Wacker	n type	7k.cm	<111>	1	PTI	58	24	8
	Wacker	p-type	10k.cm	<111>	1	PTI	58	24	8
	Wacker	n-type	1.2 k.cm	<100>	1	HIP	58	24	8
	Cz-HR	n-type	1.2 k.cm	<100>	1	HIP	58	24	8
	Cz-HR	p-type	2 k.cm	<100>	1	HIP	58	24	8
HIP	Wacker	n type	4k.cm	<111>	1	PTI	100		
	Wacker	p-type	10k.cm	<111>	1	PTI	100		
	Wacker	n-type	1.2 k.cm	<100>	1	HIP			
	Cz-HR	n-type	1.2 k.cm	<100>	1	HIP	100		
	Cz-HR	p-type	2 k.cm	<100>	1	HIP	100		
BNL	Wacker	n type	4k.cm	<111>	1	PTI	60		
	Wacker	p-type	10k.cm	<111>	1	PTI	60		
	Wacker	n-type	1.2 k.cm	<100>	1	HIP			
	Cz-HR	n-type	1.2 k.cm	<100>	1	HIP	60		
	Cz-HR	p-type	2 k.cm	<100>	1	HIP	60		

Irradiation

Inmstitution	radiation	energy	fluences
CERN	protons	24GeV	1.0E+10
			3.0E+13
			1.0E+14
			3.0E+14
			1.0E+15
			3.0E+15
SJI, Lubljana	neutrons	1MeV eq.	1.0E+10
			1.0E+13
			3.0E+13
			1.0E+14
			3.0E+14
			1.0E+15
			3.0E+15

Schedule

Row wafers sets distribution	August 03	
Test detectors processing	Sept - Nov. 03	Sept.-Feb.
Detectors irradiation	Dec. 03 - Feb. 04	May.04
Investigation	March - May 04	June-Sept
Results presentation, and discussion	June 04	October

Detectors characterization

Institutions	Techniques	Measured characteristics
PTI	C-DLTS	DL,s spectra
	TCT	Vfd, Vop, E(x), CCE
	I-V(T)	Current activation energy
HIP	C-V, I-V	Vfd,
BNL	I-DLTS	DL,s at high fluences
ITEP	electron-micr.	lattice defects in clasters
Glasgo	I-V, C-V	

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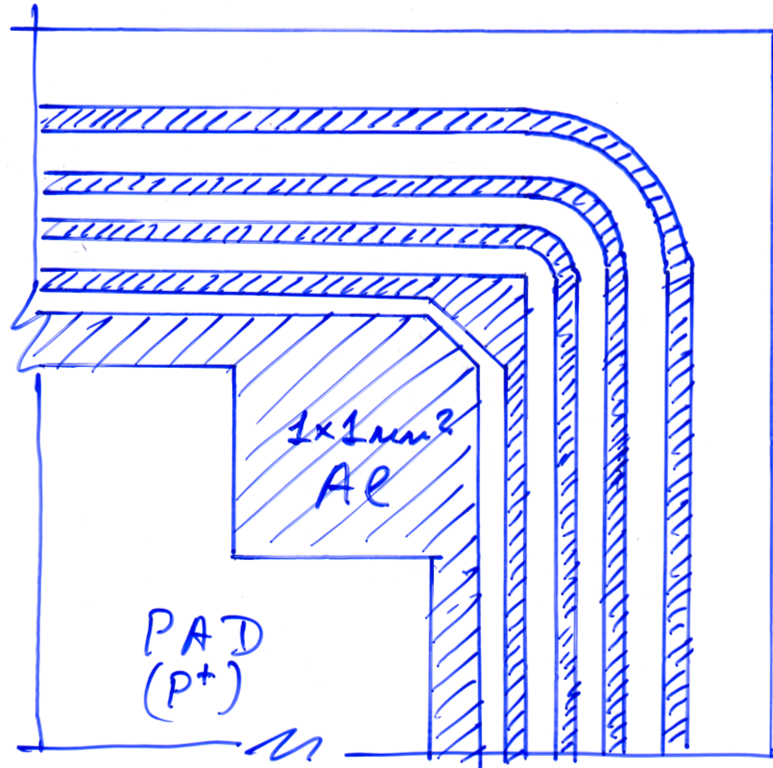
PTI test pad detectors



PAD detector

Area (p^+) – 5×5 mm²

Chip size – 6×6 mm²

Current at 100V – 2nA/cm²

$U_{oper} \geq 500V$

n^+contact – Al grid

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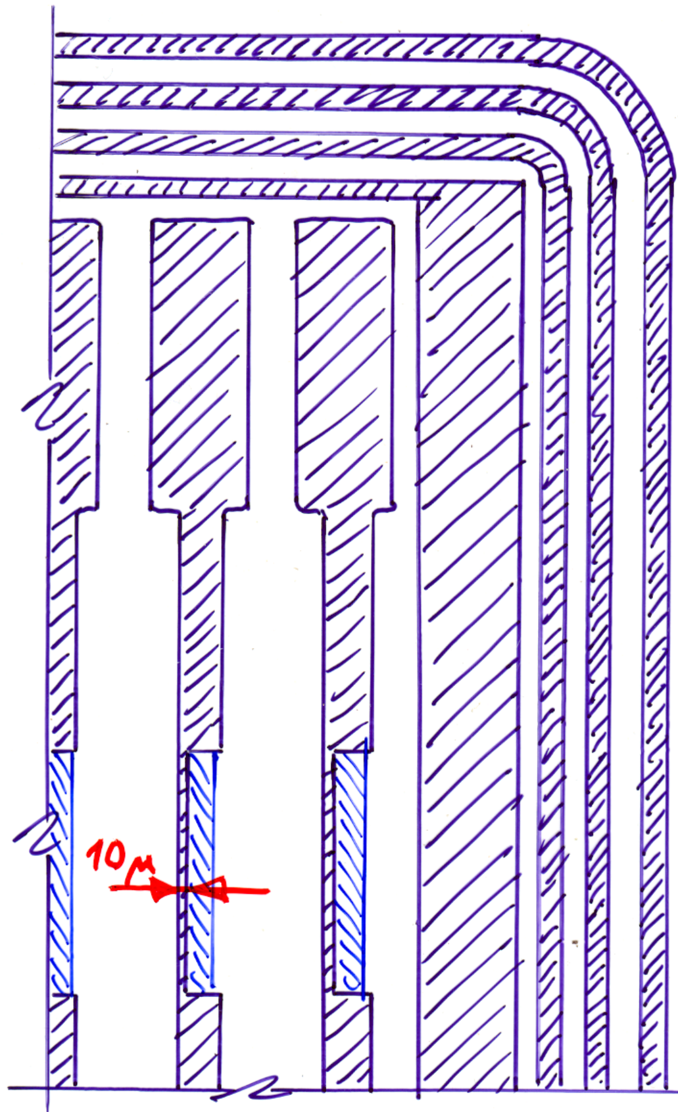
PTI test strip detectors



Area – 10×10 mm²

strip pitch – 100 μm

strip implant width – 20, 40, 80 μm

Coupling – DC

Biasing – punch-through

U_{oper} > 500 V

n^+ – Al with window

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