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Física e Instrumentação de Altas Energias com o LHC-CERN (20/04867-2) – Temático FAPESP

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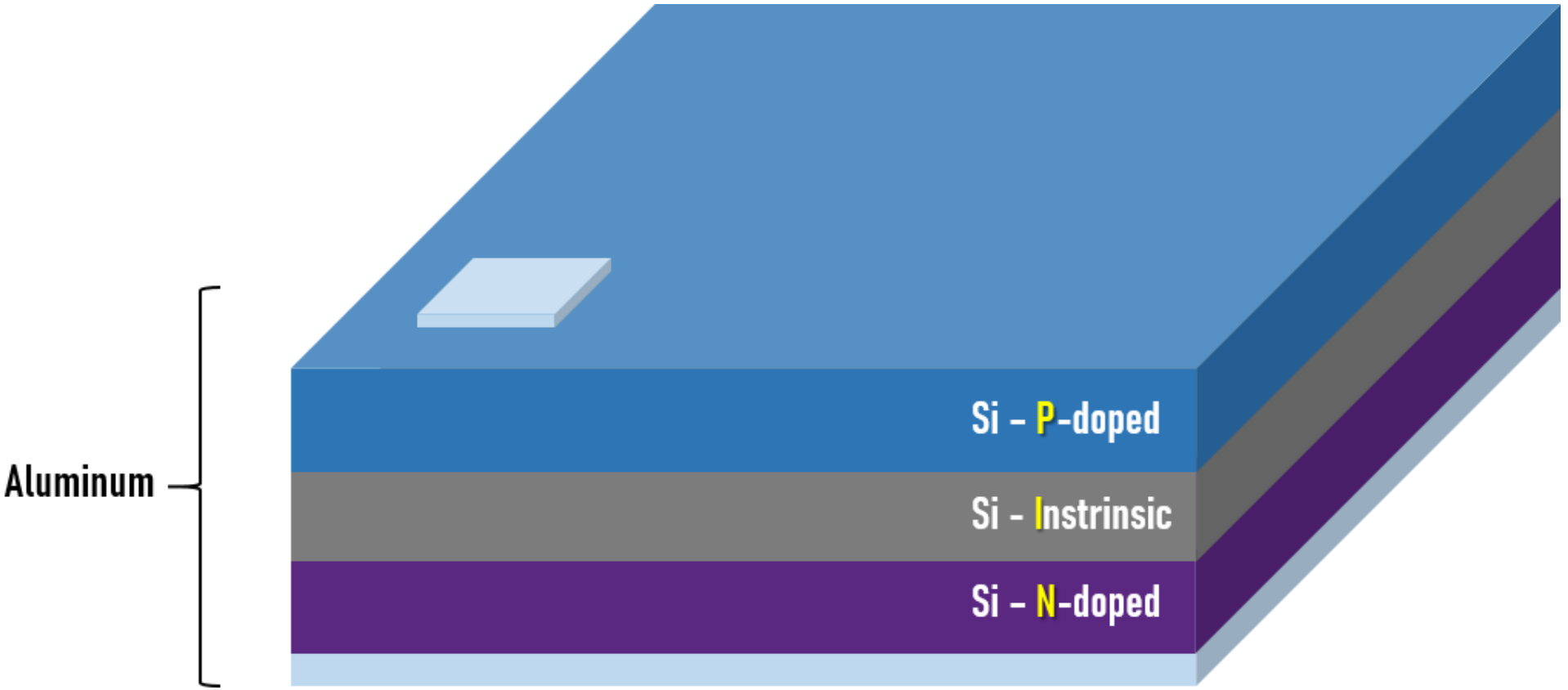
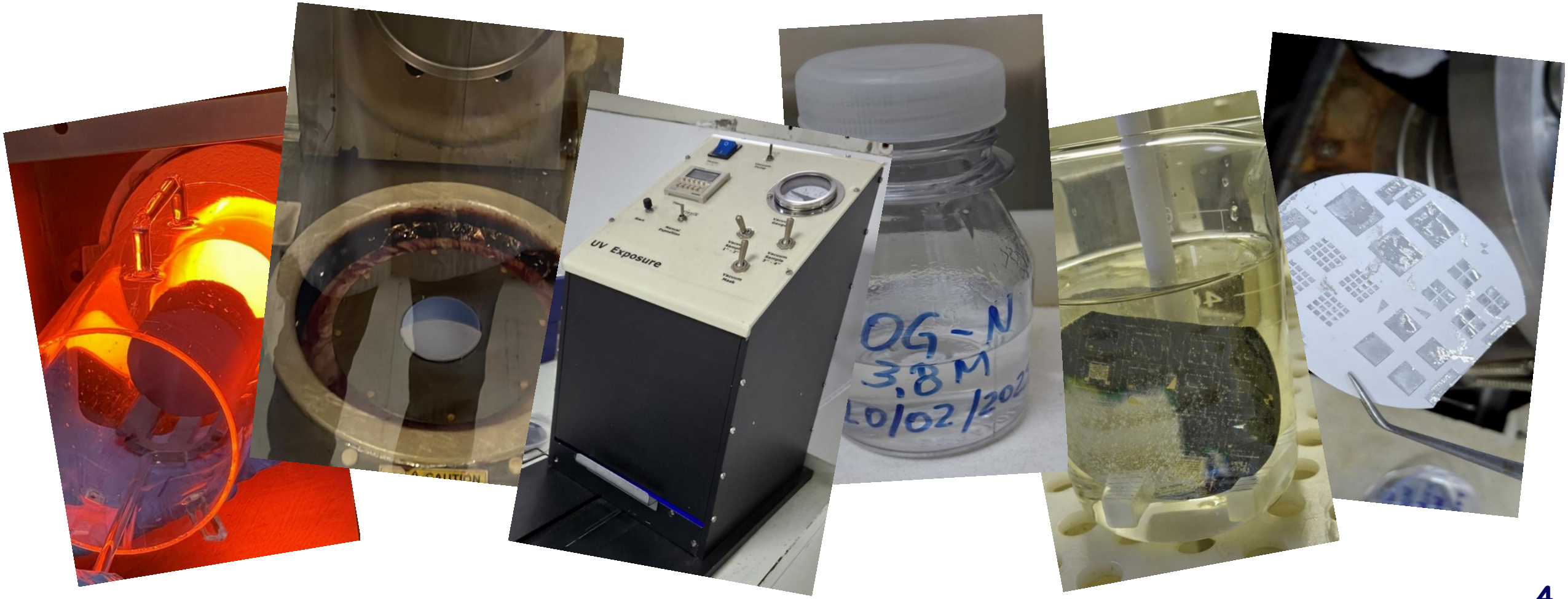
Diodos PIN: Fabricação, Integração e Aplicações

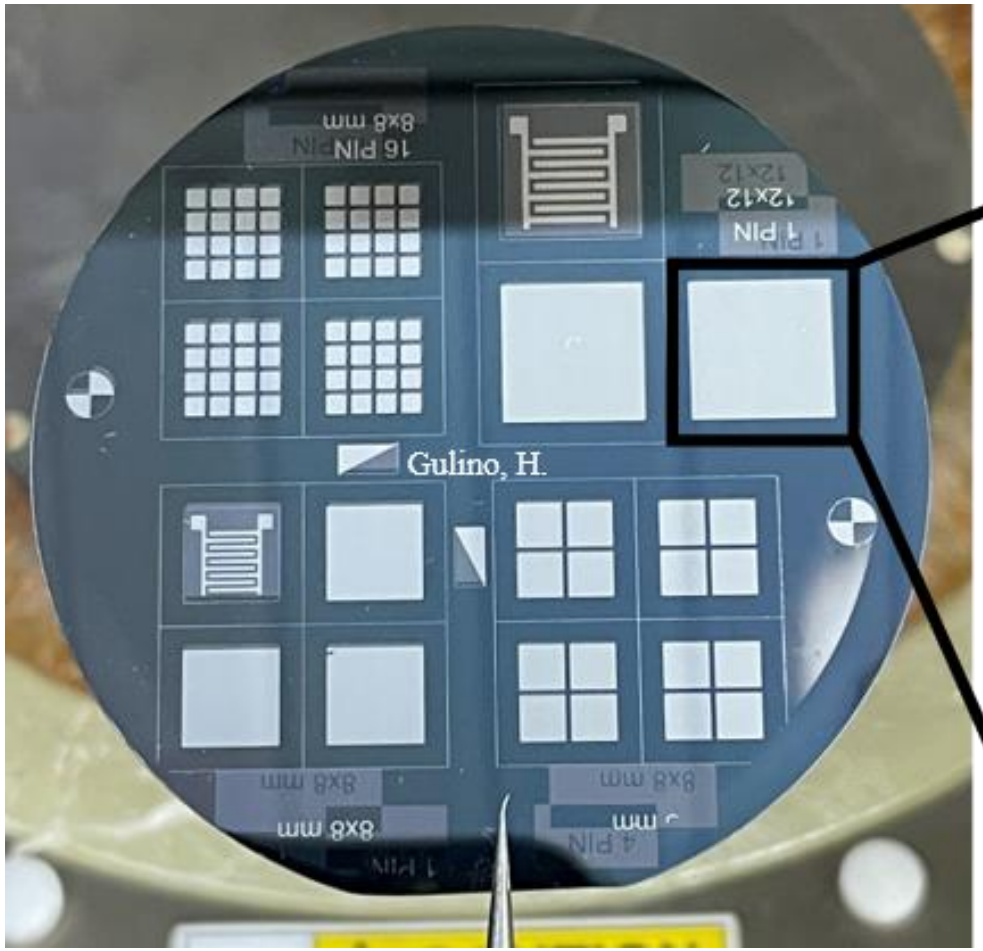
ESTRUTURA DO DIODO PIN



PROCESSOS DE MICROFABRICAÇÃO



RESULTADO FINAL



DIMENSÕES DOS DIODOS

- 2 x 2 mm
- 4 x 4 mm
- 8 x 8 mm
- 12 x 12 mm

NOVO CONJUNTO DE MÁSCARAS

Esta sendo desenvolvido um novo conjunto de máscaras

PUBLICAÇÕES

XXV International Symposium on Solid State Dosimetry

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https://inis.iaea.org/records/2peem-j2h07

2025 SBFoton International Optics and Photonics Conference (SBFoton IOPC)

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https://doi.org/10.1109/SBFotonIOPC66433.2025.11218323

PUBLICAÇÕES EM ANDAMENTO

INAC 2026 – International Nuclear Atlantic Conference

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XVII Meeting on Nuclear Applications (ENAN)

↓

Development of Brazilian Low-Cost PIN Diodes for Radiodiagnosis: Linearity and SNR Analysis in Low-Energy X-Ray Beam

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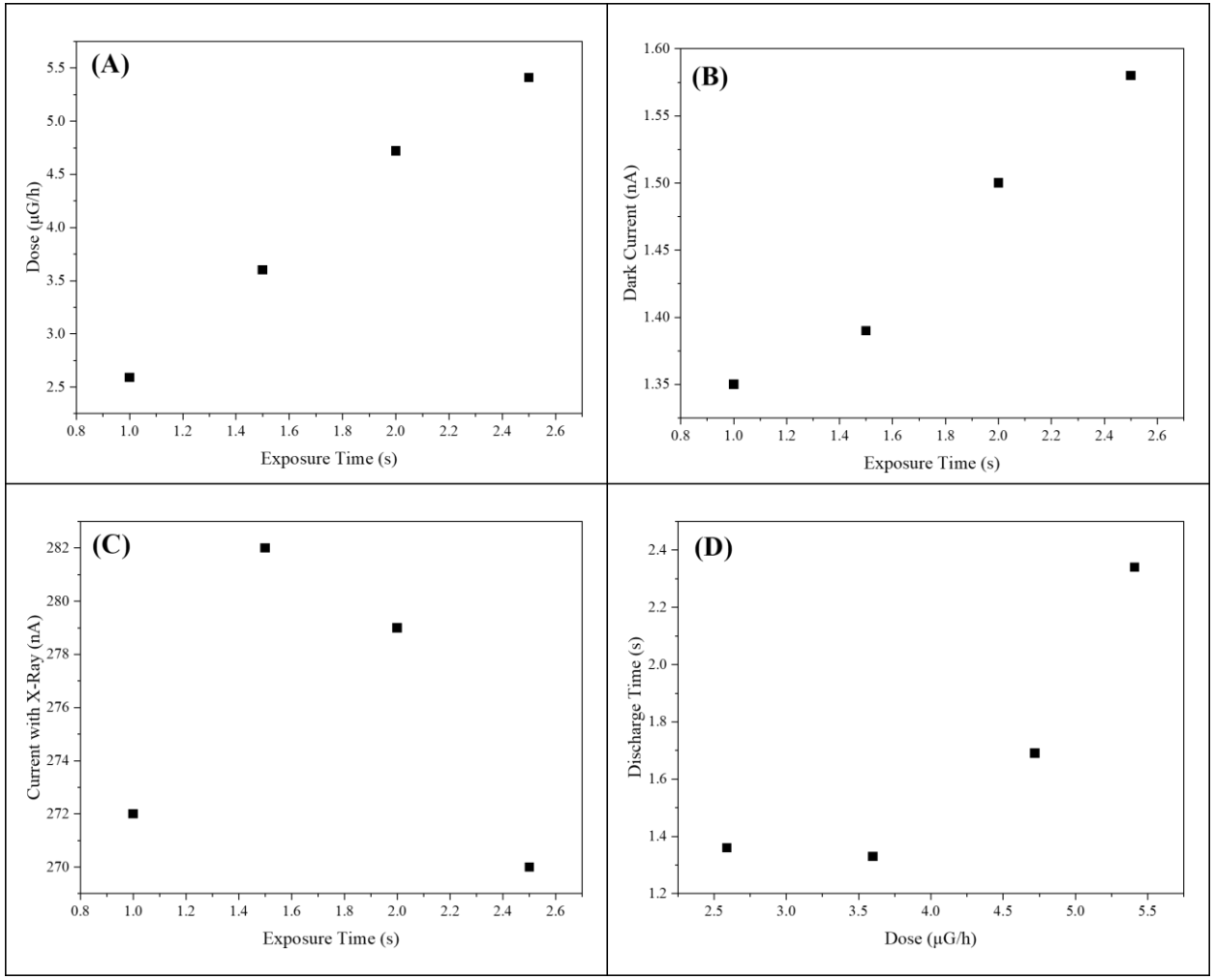
Trabalho desenvolvido em conjunto com o CETER-IPEN

PUBLICAÇÕES EM ANDAMENTO



Exposure Time (s)	Dose rate (µg/h)	Dark Current (nA)	Current with X-Rays (nA)	Discharge time (s)
2.5	5.41	1.58	270	2.34
2	4.72	1.50	279	1.69
1.5	3.60	1.39	282	1.33
1	2.59	1.35	272	1.36

Experimental characterization of the 12x12 mm PIN diode: (a) Radiation dose as a function of exposure time showing linear response; (b) Dark current stability measured across different exposure intervals; (c) Photocurrent generated under X-ray irradiation (pumping current); and (d) Recovery dynamics showing the discharge time as a function of the applied dose.

PUBLICAÇÕES EM ANDAMENTO

RADECS (RADiation and its Effects on Components and Systems Conference) 2026

↓

Design and Response Evaluation of a Brazilian Proton Burst Detection System for Satellite Radiation Monitoring

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Trabalho desenvolvido com o CTI-RA no âmbito do projeto CPSAE/CNPq #422360/2023-6

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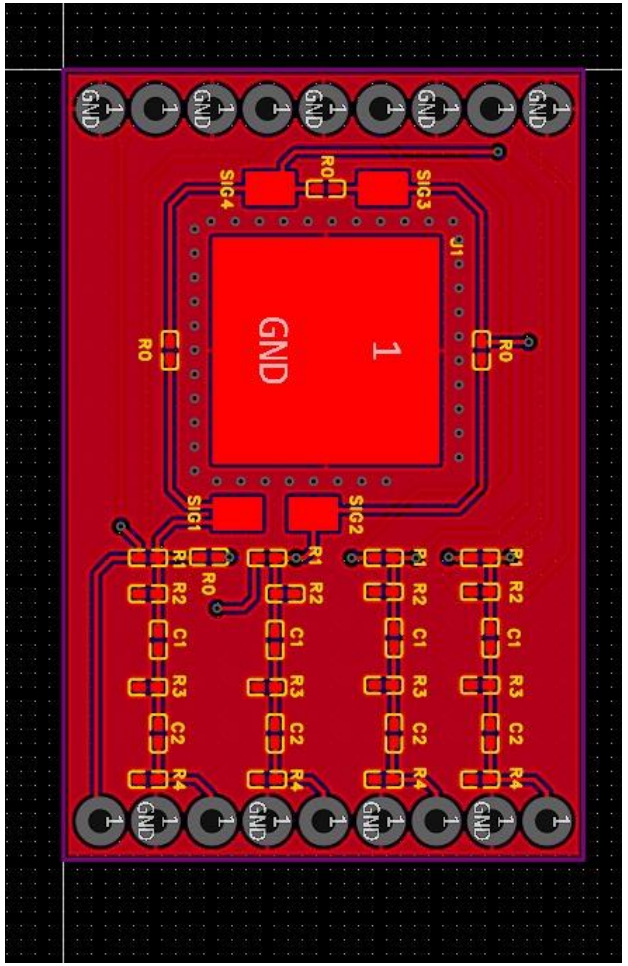

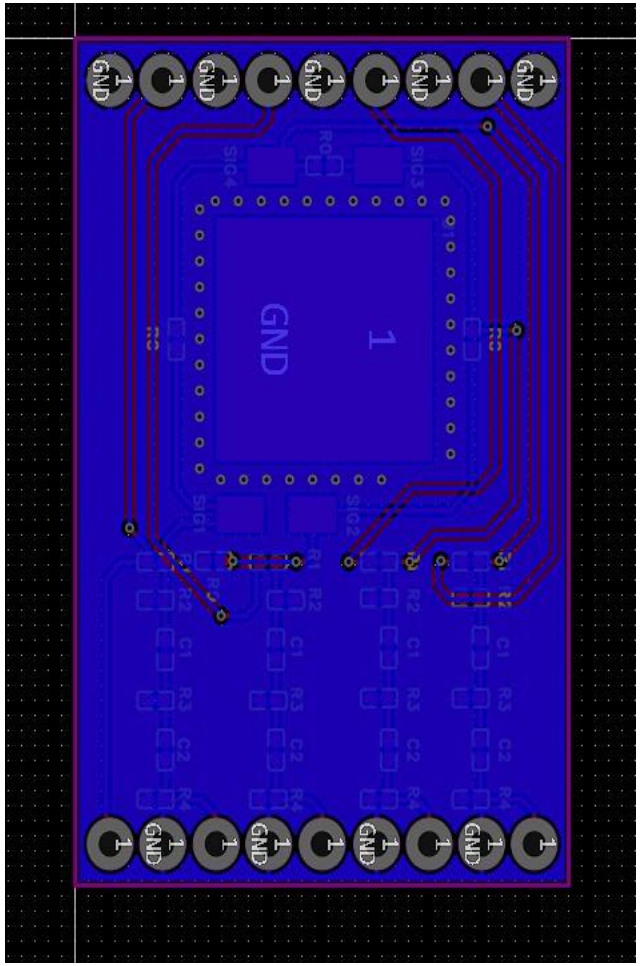

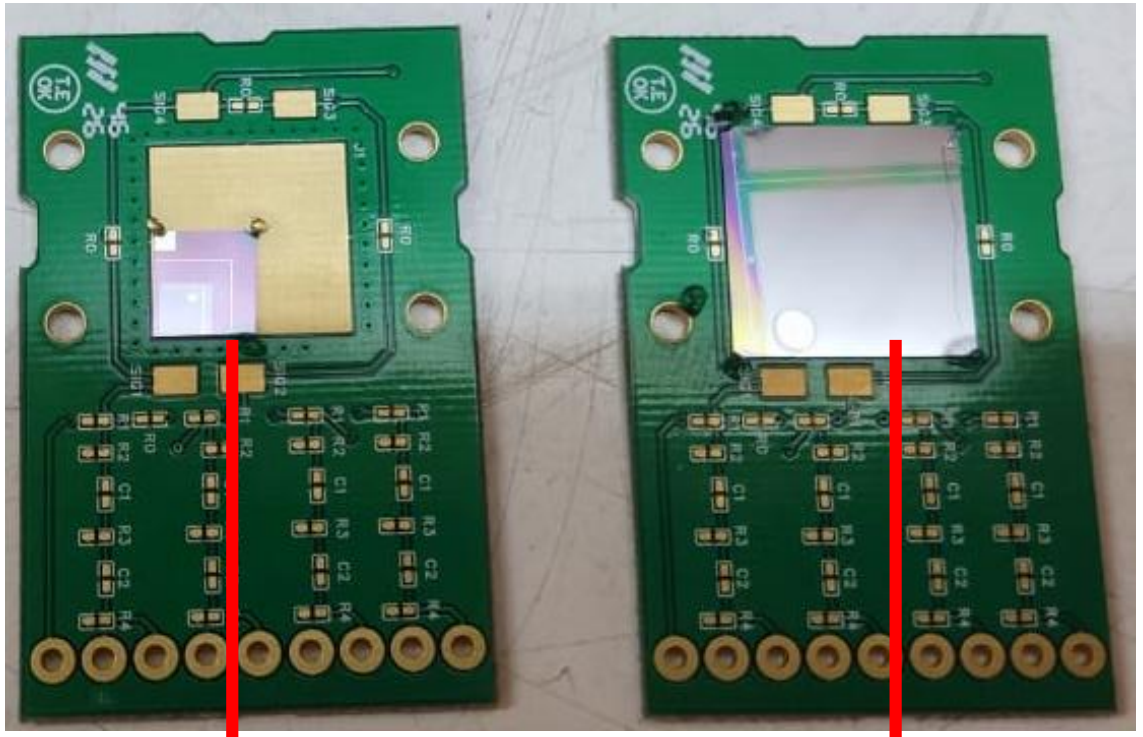

4 x 4 mm

12 x 12 mm

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Irradiação com prótons

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Paul Scherrer Institute (PSI), Suiça

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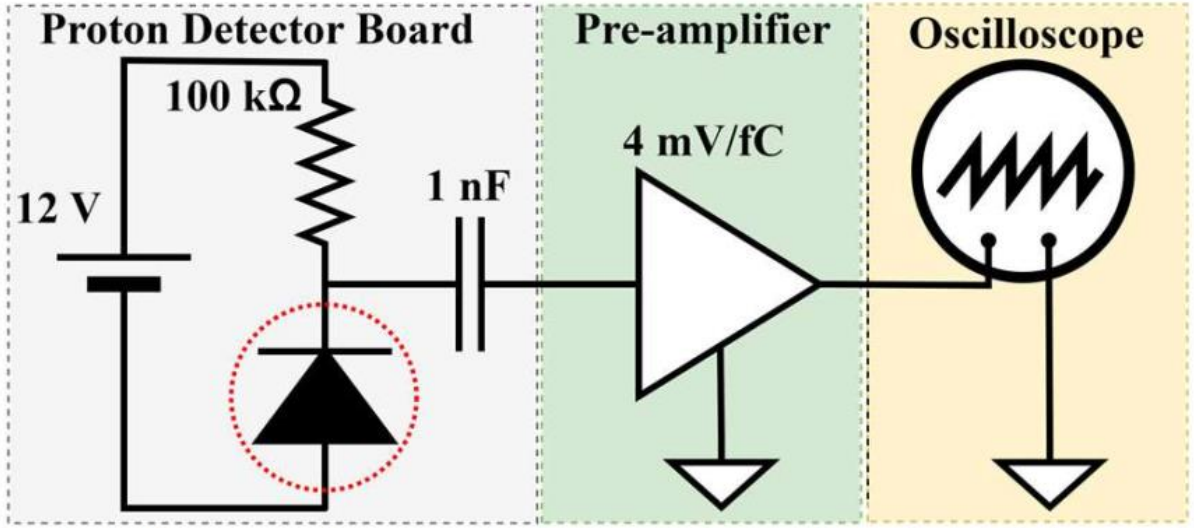

Fig. 4. Schematic diagram of the experimental readout chain used to measure the temporal response of the proton bursts. The proton detector board consists of a reverse-biased diode powered by a 12 V supply, with a 100 kΩ bias resistor and 1 nF coupling capacitor. The signal is then processed by the SAMPA front-end preamplifier configured with a gain of 4 mV/fC and finally recorded by a high-speed oscilloscope for temporal waveform acquisition.

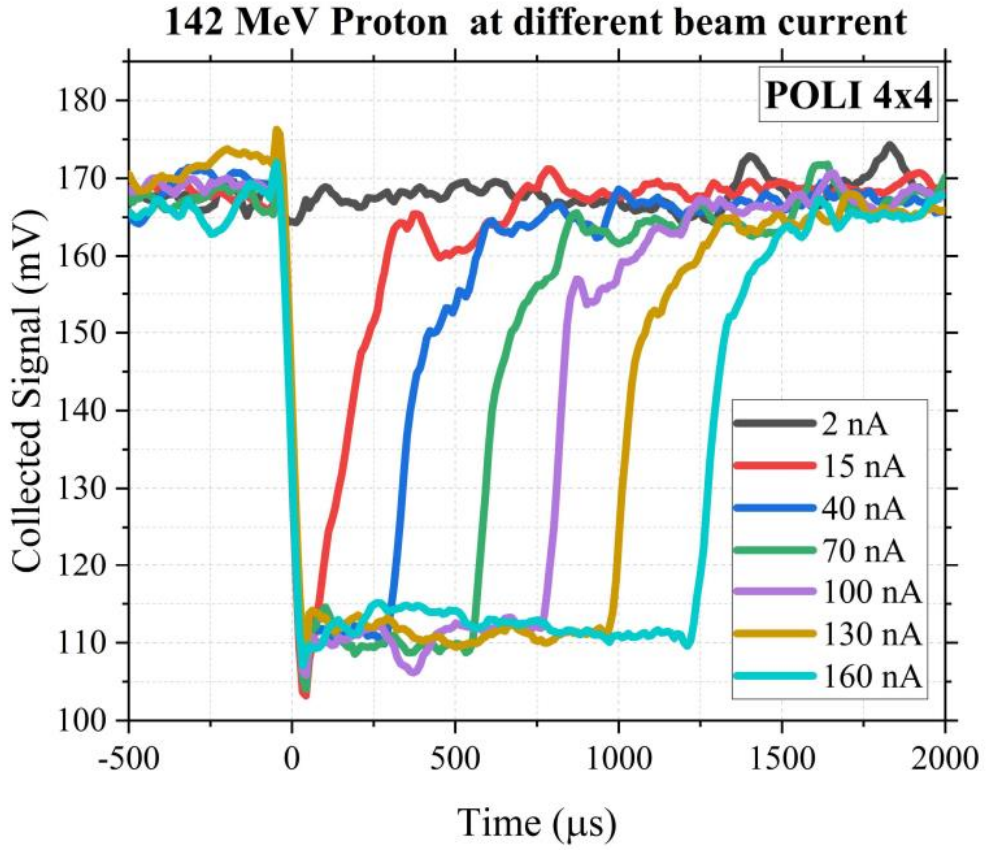

Fig. 5. Temporal response of the POLI 4x4 readout circuit to 200 ms proton bursts with an energy of 142 MeV.

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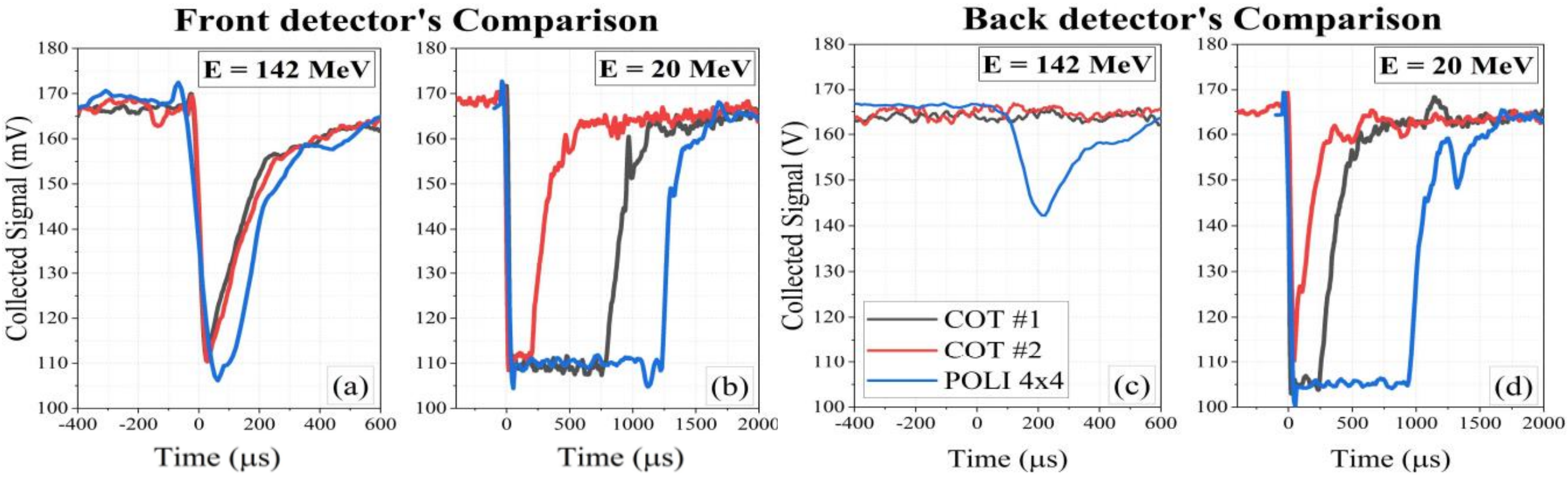

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TABLE I.
DETECTOR'S BURST WIDTH NORMALIZED BY THE ACTIVE AREA.

FRONT	**COT#1** ($\frac{\mu m}{mm^2}$)	**COT#2** ($\frac{\mu m}{mm^2}$)	**POLI 4x4** ($\frac{\mu m}{mm^2}$)
20 MeV	76.2 ± 3.8	25.6 ± 1.3	100.8 ± 5.1
142 MeV	6.2 ± 0.3	6.9 ± 0.4	8.75 ± 0.5
BACK	**COT#1** ($\frac{\mu m}{mm^2}$)	**COT#2** ($\frac{\mu m}{mm^2}$)	**POLI 4x4** ($\frac{\mu m}{mm^2}$)
20 MeV	30.9 ± 1.5	3.2 ± 0.2	58.75 ± 2.9
142 MeV	0	0	5 ± 0.2

RESUMO

Aplicações em Satélites

Aplicações Dosimétricas

Aplicações em Altas Energias

Entre outras aplicações...


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ACKNOWLEDGMENTS