



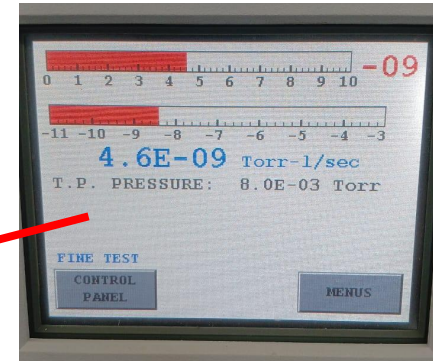
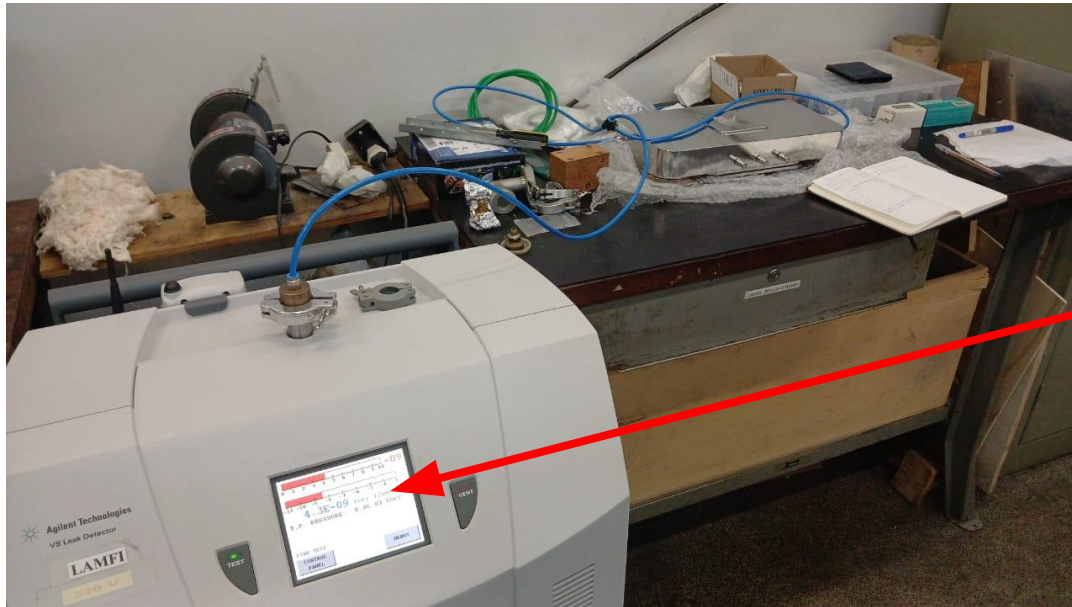
# Updates WG5.1

Marco Bregant & Tiago Fiorini Da Silva

V Reunião Geral - Projeto Temático FAPESP "Física e Instrumentação de Altas Energias com o LHC-CERN"

# Estudos de envelhecimento e degradação

Finalização dos testes da câmara de degradação:

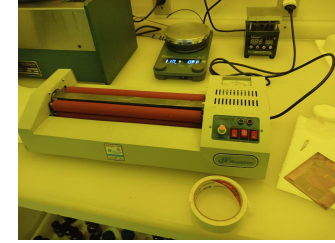
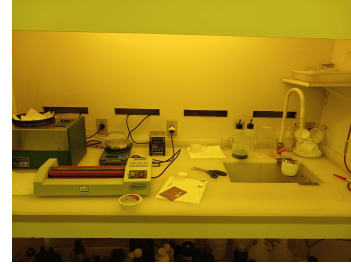
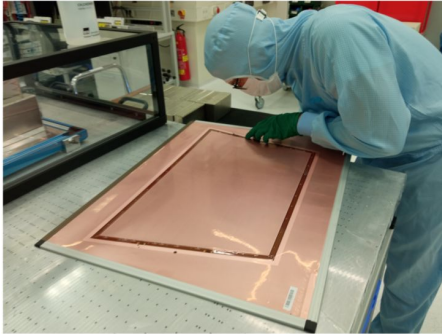


1 Torr.L/s = 1.32 cm<sup>3</sup>/s (CNTP)

Estanqueidade de ~0,3 ppb/s.

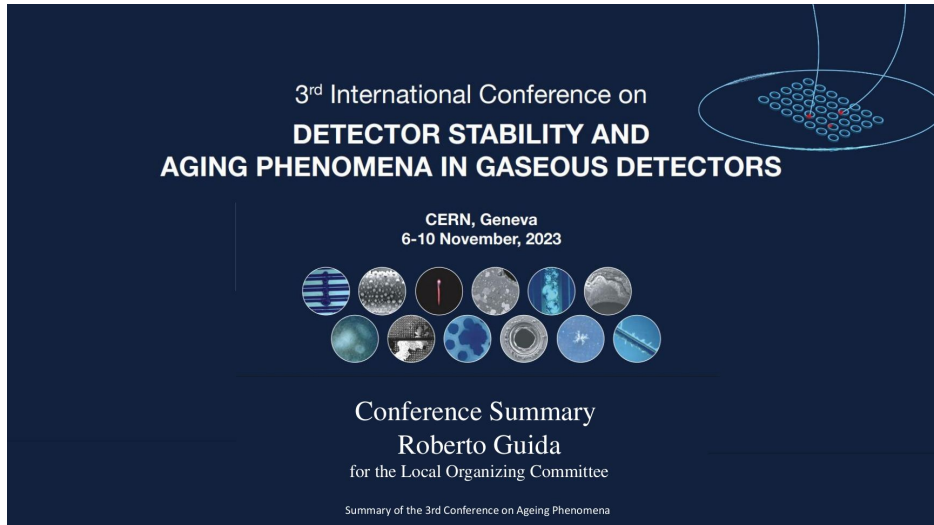
# Estudos de envelhecimento e degradação

Produção de amostras:



# Estudos de envelhecimento e degradação

Participação em conferência:



3<sup>rd</sup> International Conference on  
**DETECTOR STABILITY AND  
AGING PHENOMENA IN GASEOUS DETECTORS**

CERN, Geneva  
6-10 November, 2023

Conference Summary  
Roberto Guida  
for the Local Organizing Committee

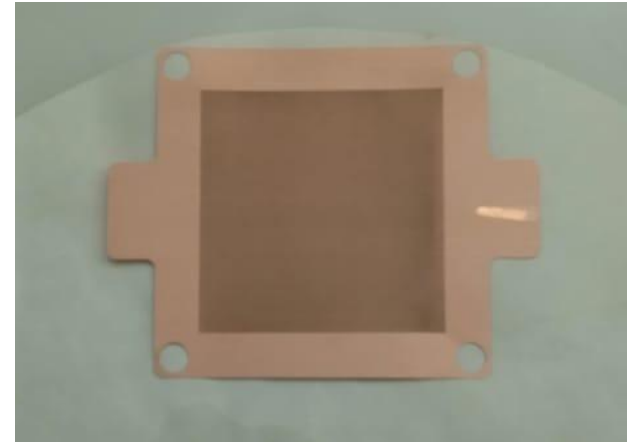
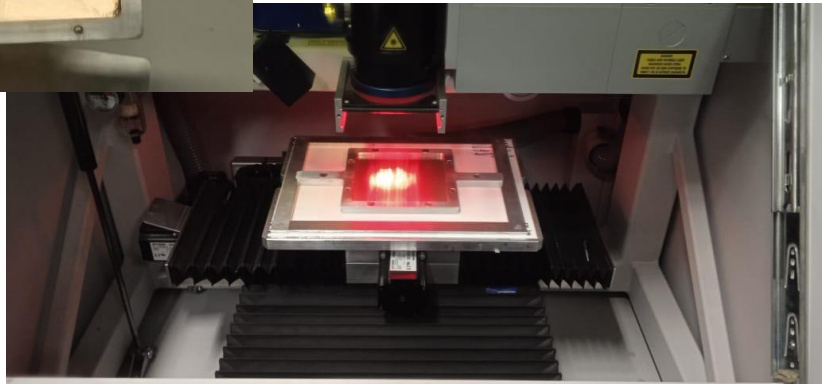
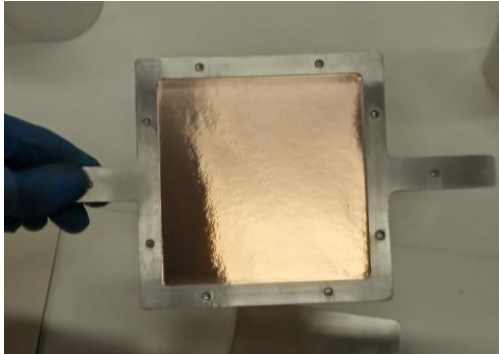
Summary of the 3<sup>rd</sup> Conference on Ageing Phenomena

The graphic features a dark blue background with a grid of 16 circular icons in the center, each depicting a different detector component or aging phenomenon. Above the icons is a stylized diagram of a detector structure. The text is white and centered.



# Produção de GEMs

Produção por ablação a laser



# Simulações de GEMs

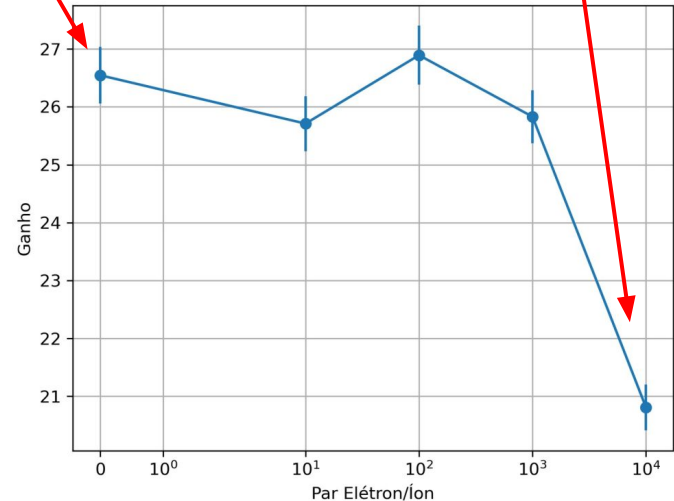
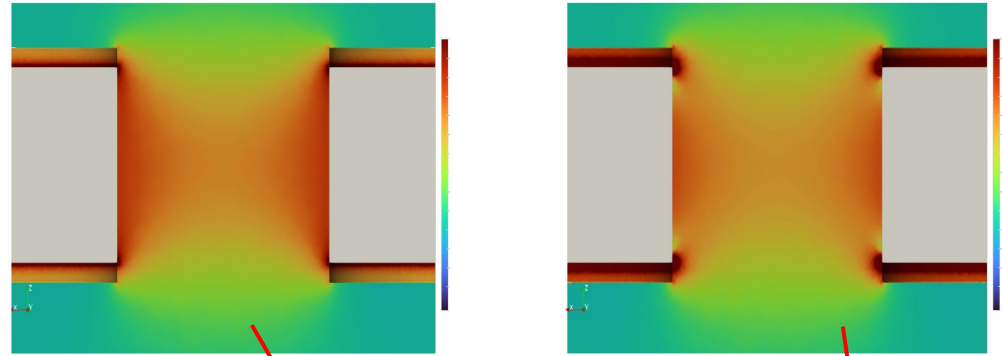
Estudos de charge up

Finalização de projeto

Natalia Marie dos Santos Decroix  
(IC FAPESP - Temático)

Início de Mestrado

Bruna Beatriz Tizoni Francisco  
(FAPESP - PI)





# Avaliação de qualidade

Novo estudante:

Caio de Sousa Ribeiro (IC FAPESP - PI)

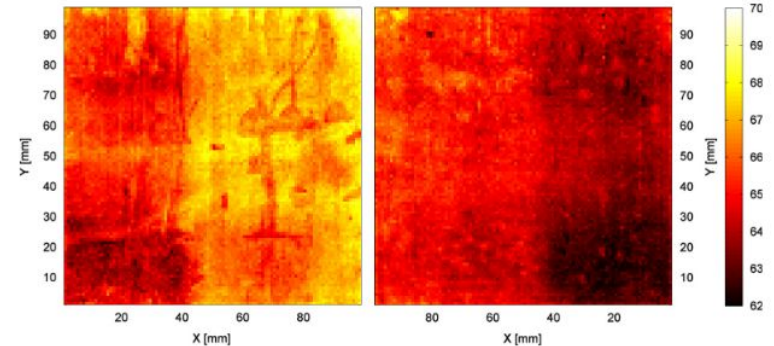
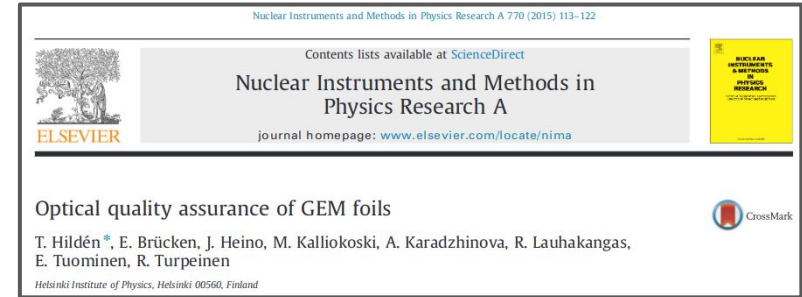
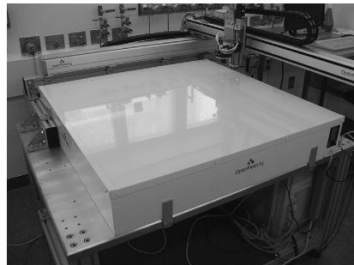


Fig. 14. Outer hole diameter histograms from top (left) and bottom (right) sides of foil 5. Bin width is 1 mm<sup>2</sup>. Diameters are in  $\mu\text{m}$ .

# From RD51 to DRD1

Following the “recommendations” of the ECFA, CERN forced to re-organize the projects acting in the R&D of detectors, "new (code)name: DRDs (Detector R&D). Still active RD## were closed, and became part of the new DRDs

- Thus, RD51 ended its activity in December 2023;
- All along 2023 was outlined the new “DRD1: gaseous detectors”
- The “old” RD51 community was a key player and leader in the “molding” of this new DRD1
- A lot of discussion and meetings occurred during 2023 to shape the new collaboration/network, “importing” all the good experience of RD51
- The “DRD1 Extended R&D Proposal” document ( <https://cds.cern.ch/record/2885937> , CERN-DRDC-2024-003 ) was prepared during the year.
  - M. Bregant contribute to the “electronics” section, and he is presently one of the two “liaisons persons” with DRD7 (“Electronics”)
- First Collaboration meeting at the end of January 2024 (<https://indico.cern.ch/event/1360282/>). A nice overview of the activities :-) ... and a lot of discussions about organizative stuffs :-)
- Presently “we” are registered as a single group, “USP”, (to be split as soon as we find it convenient...), and “we” are following several working groups:
  - WG4-“Modelling and Simulation”: [Tiago and Edmilson](#)
  - WG5-“Electronics”: [Marco](#)
  - WG8-“Knowledge Transfer, Training and Career”: [Tiago](#)
- and we are involved in the Work Package 4 (“INNER AND CENTRAL TRACKING WITH PID CAPABILITY, TIME PROJECTION CHAMBERS”), Task 4 (“FEE for TPCs”)



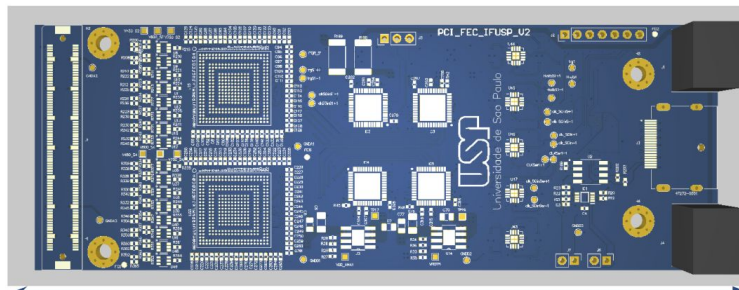
# MPGD Electronics: SAMPA-SRS

We had the nice presentation by Geovane this morning...

But let me highlight that after some delay with components and fabrication, we have now the most recent version the hybrids. Presently under test (and debugging :-)

## New hybrid boards - V2 and V3

Old V2



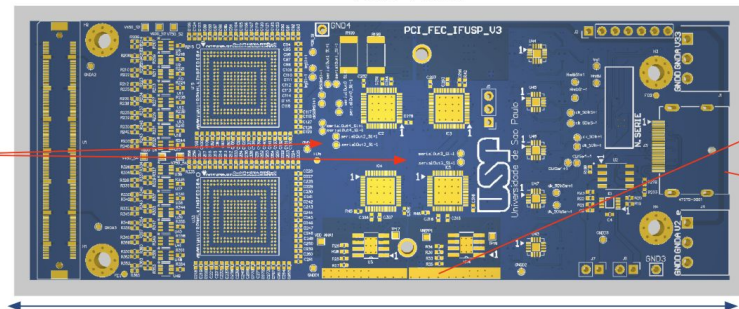
139 mm

The new hybrid fits the TPC space

New V2/V3

Additional clock test points

GND



135 mm

Heat sink

Displayport connector can be mounted on both sides

# MPGD Electronics, Status

- *Hardware integration of SAMPA in the SRS ecosystem*
  - *First prototype of hybrid and interface-card were tested and validated in 2022. Updated hybrid were mounted in the second half of 2023, and are presently being validated.*
- *Development of dedicated software and drivers for SAMPA in the SRS system*
  - *First version of acquisition software developed and working since early 2023. Being improved and updated regularly*
- *Development of a compact standalone acquisition system based on SAMPA (HW)*
  - *Proof of principle using and adapter card and a SoCKit CycloneV in 2023. No progress in the last 12 months*
- *Development of acquisition software and drivers for the standalone acquisition*
  - *Proof of principle modifying the software used during SAMPA test/validation. No progress in the last 12 months*
- *Development and optimization of reconstruction routines*
  - *Studies on clustering ( Thais' article), data selection, tracking, etc. in the Geovane's theses. Maintained and improved regularly.*
- *Studies for a next generation electronics for MPPGD*
  - *Under discussion "next SRS".*
  - *Next generation ASIC (Salsa project ), even if outside Tematico, is ongoing. Main building blocks (analog front-end, ADC, PLC) prototypes designed, fabricated and under test. New, improved and/or more complex prototypes under development*

# MPGD Applications, Status

- Study and optimization of single layer 10B converter associated to GEM-based amplification and readout (thermal neutron beam monitor)
- Validation of beam monitor for thermal neutrons
- Study and optimization of multilayer, 10B coated ThickGEM based, converter for thermal neutron (detection efficiency optimization)
  - We had the first prototype in the Lucas' Master (before Tematico). Extensive simulation study in the Renan's Master. *No news in the last 12 months*
- Apply GEM-detector on Soft X-ray “colored image” (for arqueometry)
  - was part of Geovane's Thesis. To be resumed as soon as the new hybrids are validated
- Apply GEM-detector to make a dual-energy CT for didactical and training purposes
  - Gustavo Freire Pereira da Silva “doutorado direito”, with FAPESP fellowship
- Developing and validation of a big-area, efficient, position sensitive, thermal neutron detector // Study and development of customized application for neutron detector (e.g. RMB)
  - Lack of manpower. We need to be more aggressive in searching students...
- Development of a prototype for monitoring of runaway electrons in a fusion reactor // Validation and accreditation of data using monochromatic electron beam // Development of a prototype for monitoring of runaway electrons in a fusion reactor // Validation and accreditation of data using monochromatic electron beam
  - Local Tokamak in maintenance since before pandemic... we need some boost on these lines

# Schedule overview

MPGD Electronics	1y	2y	3y	4y	5y	
Hardware integration of SAMPA in the SRS ecosystem	X					90%
Development of dedicated software and drivers for SAMPA in the SRS system	X	X				70%
Development of a compact standalone acquisition system based on SAMPA (HW)	X	X				35%
Development of acquisition software and drivers for the standalone acquisition	X	X	X			10%
Development and optimization of reconstruction routines	X	X	X	X		50%
Studies for a next generation electronics for MPPGD		X	X	X	X	25%
<b>MPGD Applications</b>						
Study and optimization of single layer $^{10}\text{B}$ converter associated to GEM-based amplification and readout (thermal neutron beam monitor)	X	X				50%
Validation of beam monitor for thermal neutrons		X				0%
Study and optimization of multilayer, $^{10}\text{B}$ coated ThickGEM based, converter for thermal neutron (detection efficiency optimization)	X	X	X			10%
Developing and validation of a big-area, efficient, position sensitive, thermal neutron detector		X	X	X		0%
Study and development of customized application for neutron detector (e.g. RMB)		X	X	X	X	0%
Development of a prototype for monitoring of runaway electrons in a fusion reactor		X	X			0%
Validation and accreditation of data using monochromatic electron beam				X		0%
Development of a prototype for monitoring of runaway electrons in a fusion reactor		X	X			0%
Validation and accreditation of data using monochromatic electron beam				X		0%

reasonably on  
schedule  
(but standalone system...)

urgency to  
resume that!  
(= a student)

is it still alive?

# Nossos jovens colaboradores (atuais)

Geovane Grossi Araújo de Souza (TT5)

Caio de Sousa Ribeiro (IC)

Thiago Badaró Saramela (Doutorado)

Pedro Sviatopolk Mirsky Scarazzato (IC-PIBIC)

Gustavo Freire Pereira da Silva (Doutorado)

Aline Paulo da Costa (IC-PUB)

Eduardo dos Santos Palermo (Mestrado)

Guilherme de Carvalho Passos (IC-PUB)

Bruna Beatriz Tizoni Francisco (Mestrado)

Yuri Idalgo de Matos da Silva (Mestrado)

Thanks!