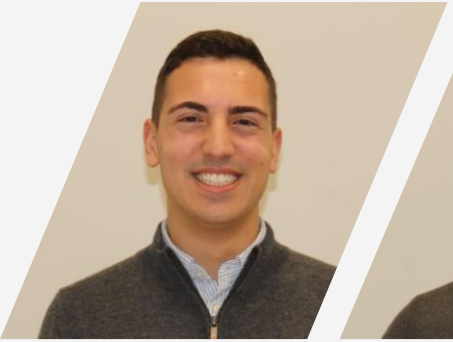
Particles4Health

Radiotherapy Application Development and Optimization

LIP




Team




And the most valued help from the electronics lab. Thank you Miguel Ferreira, José Carlos Nogueira


Activities

Activities mainly related to technology development for beam control and monitoring with very fast detectors and electronics

- Three main activities at this moment:
  - BoneOscopy
  - FlashGuard
  - PicoMonitoring

These activities are direct spin-offs from fundamental research in Astroparticle (Auger) and Particle Physics (ATLAS, CMS)

BoneOscopy

- Estimate calcium concentration during proton treatments
- LIP responsibilities
  - Trigger detector to signal particles entering treatment room
  - Electronics: Fast front-end electronics
  - Participation in all WP
- Funding: EIC grant 550 k€
- Timeline: 5 years

BoneOscopy

- First year
  - Defining requirements and standards (deliverable)
  - Started detectors design and performance tests
    - Trigger detector (our responsibility) based on fibres + SIPM
    - Procurement
    - Testing readout of SiPM: target 1ns resolution
    - Planning tests on timing resolution
  - First tests at Marburg (MIT)
    - Understand the beam structure

FlashGuard

- A Cherenkov detector to monitor FLASH beams
- Applicable to all RT beams
- Patent application
- Selected for 2nd phase of lab2market
- 2 prizes at JEF awards
- Application to La Caixa Health impulse, stage 1
- 1 PhD, 1 Master, 1 Graduation student involved

FlashGuard

- A Cherenkov detector to monitor FLASH beams
- Applicable to all RT beams
- Patent application
- WON lab2market
- FUNDED by La Caixa Health impulse, stage 1 (50k€ 1 year)
- WON Youth Start-up competition
- WON MIT Portugal 100K
- Spin-off company RTBeamTech
- Second (Provisional) patent
- 2 PhD, 1 Master, 1 Graduation student involved
- Possibility to apply for Health impulse stage2
- First Tests of a full prototype

Advisory Board

Dr. Maurizio Vretenar, PhD:

- **Coordinator of the EuCARD2**, **ARIES** and **IFAST** European Projects at **CERN** and part of the Hitriplus project.
- **Leader of NIMMS** (Next Ion Medical Machine Study) group at **CERN.**
- Provides contacts and technical support.

Prof. Brian Pogue, PhD:

- **Robert A. Pritzker Professor of Biomedical Engineering**, Dartmouth.
- **Co-Founder** and **President, DoseOptics LLC.**
- **Several patents** on Cherenkov based technology for radiotherapy, more than 600 published articles and $52 million in research funding.
- Voluntarily accepted to be a part of advisory board as he believes in the team, solution and potential.

Vitor Crespo:

- **Partner at HealthTech Portugal.**
- **Co-Founder** and **CEO, Criam.**
- Extensive experience in Business Management, Business Scaling and Fundraising.
- Provides Mentoring and Coaching, as well as guidance in the setup and expansion of the business.

Awards and Distinctions

Prof. Pedro Assis featured by Observador in the "Brilliant Minds" segment with the FLASHGuard Project

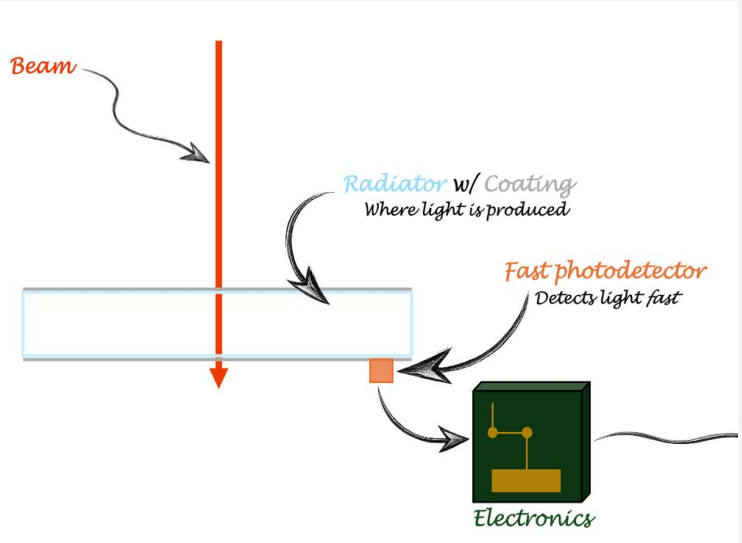
Gonçalo Ribeiro wins Youth Start-Up Competition 2025 for innovation in cancer treatment

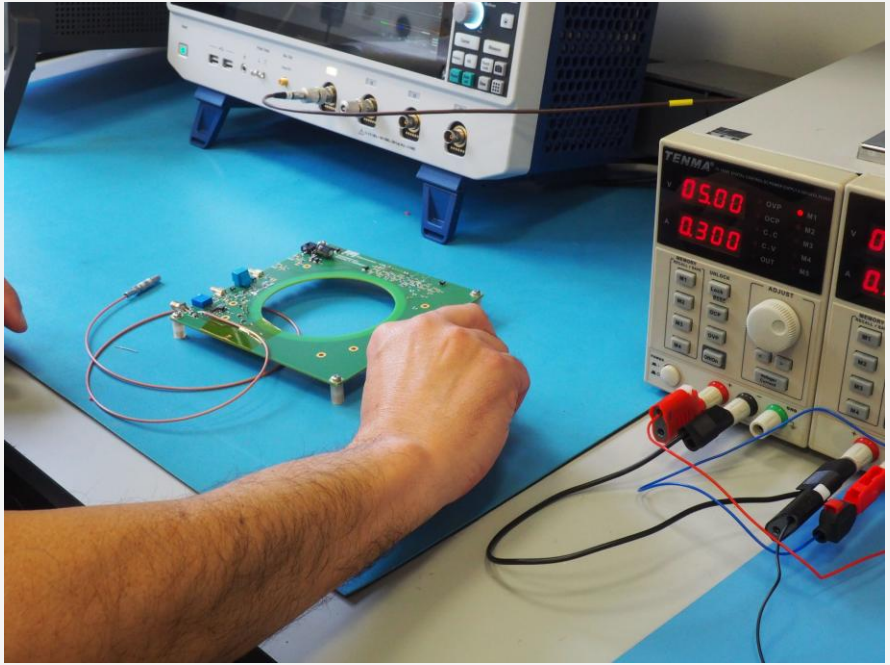
FLASHGuard wins the Healthtech Lisboa Award in the 3rd edition of the Lispolis Ignite program

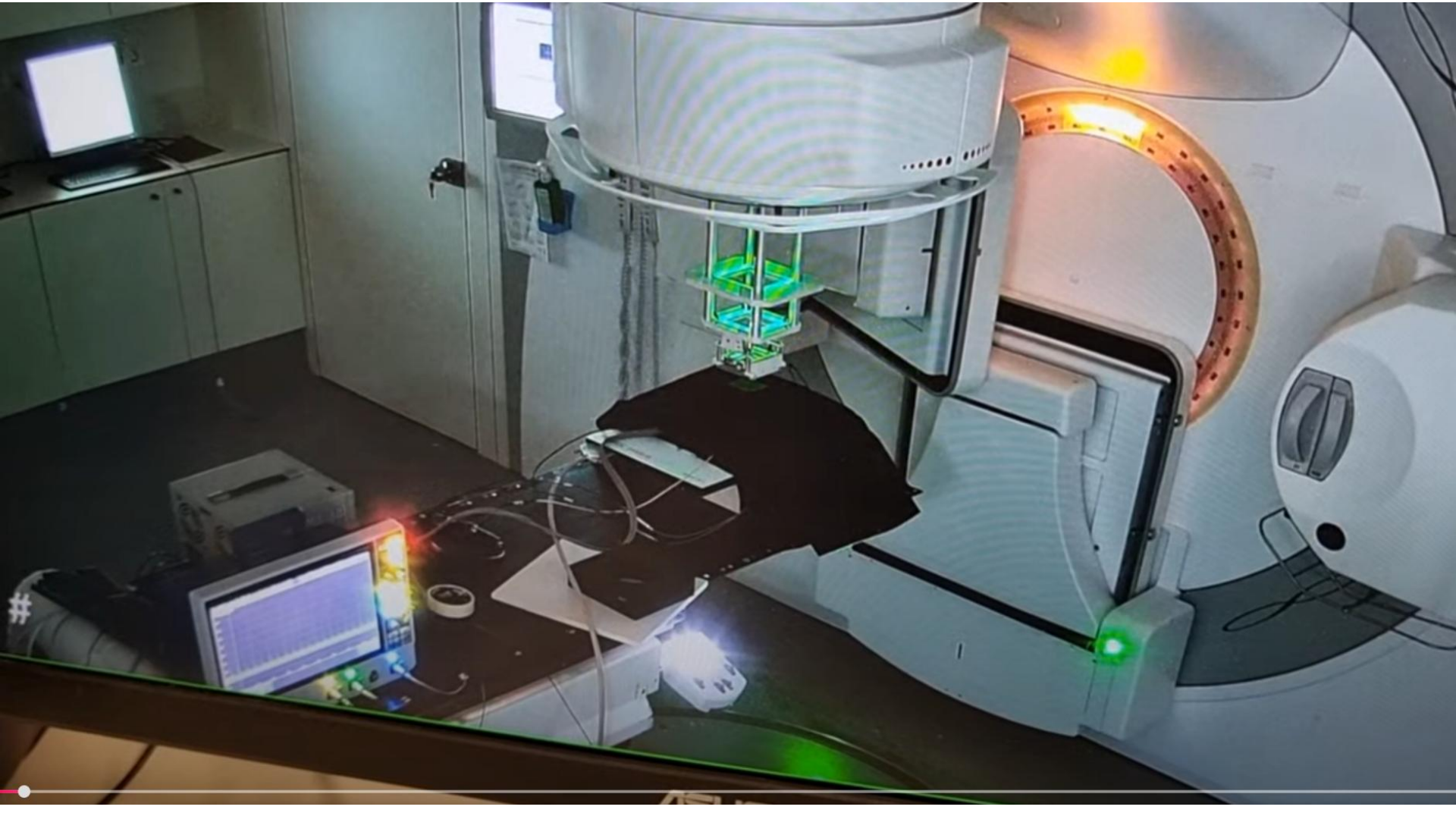
FLASHGuard Project awarded CaixaImpulse Health Innovation Grant

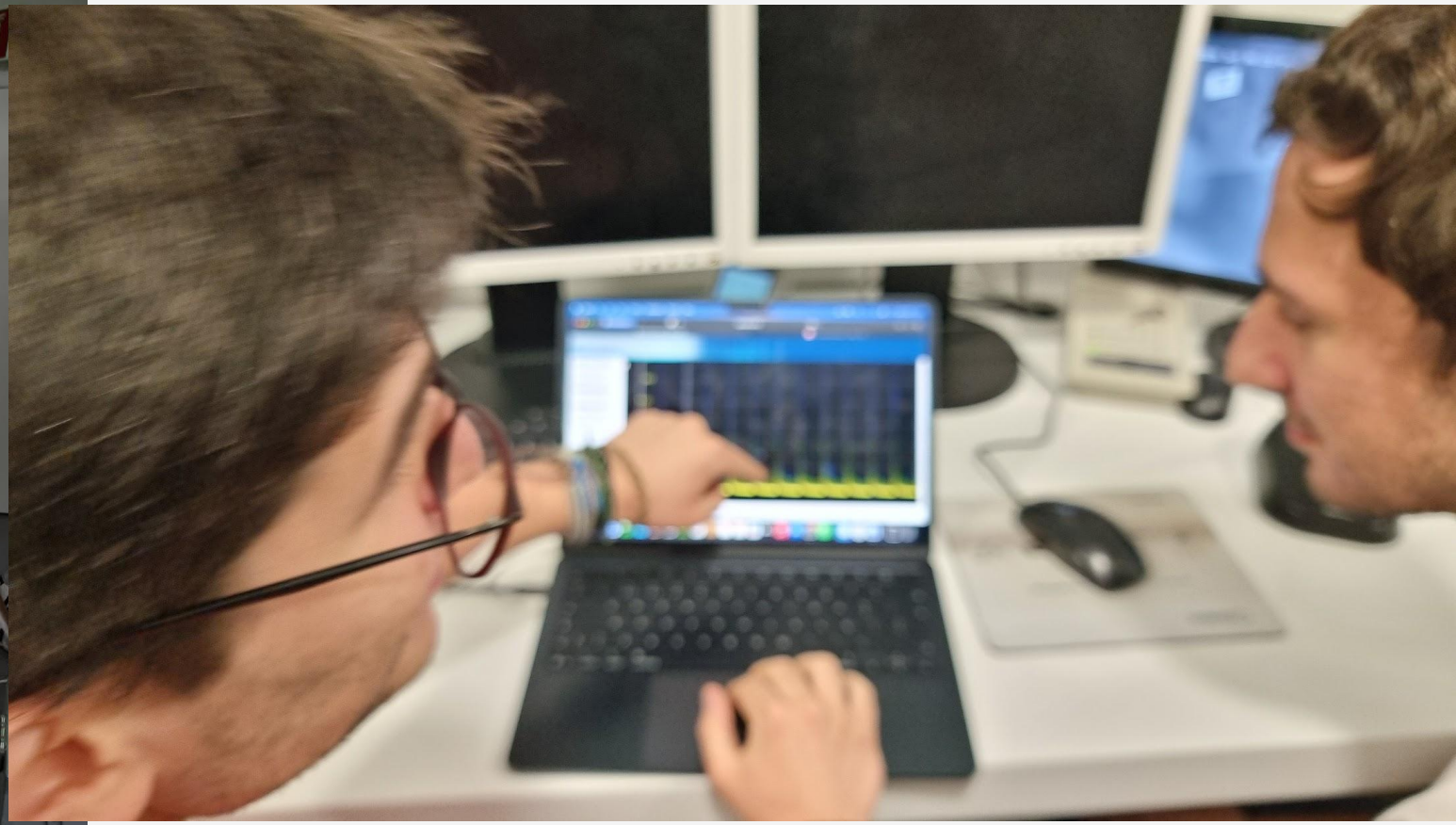
FLASHGuard Project wins Lab2Market@Técnico 2025

First prototype





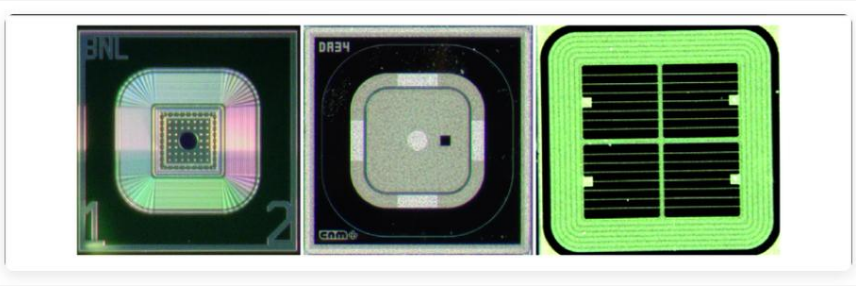




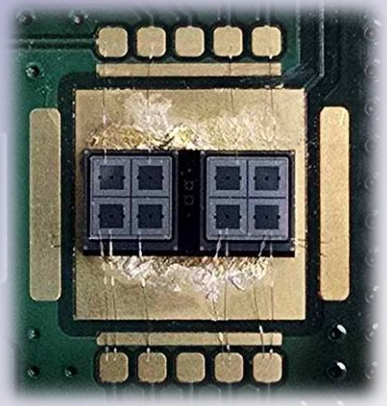
First data on protype

PicoMonitoring

LGAD to measure sub-ns structure



- LGAD based sensor for beam monitoring
- Developing prototype setup for tests at Germany
- A reference detector for other systems
- Main challenge will be to reduce perturbations on beam



Thanks to CMS and ATLAS groups

FLASHGuard

An RTBEAMTECH technology

A new device to make cancer treatments safer and more effective

LIP

TÉCNICO UNIVERSIDADE DE LISBOA

fct Fundação para a Ciência e a Tecnologia

BPI

Fundação "la Caixa"

BoneOscopy

Live Cell Spectroscopy Analysis for Personalised Particle Radiation Therapy of Metastatic Bone Cancer

Pedro Assis | BoneOscopy information

Scientific Advisory meeting | LIP | Apr. 2026

European Innovation Council

Funded by the European Union and supported by the Swiss State Secretariat for Education, Research and Innovation (SERI) under contract number 101185141. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Innovation Council and SMEs Executive Agency (EISMEA). Neither the European Union nor the granting authority can be held responsible for them.

Thank you
for your attention.

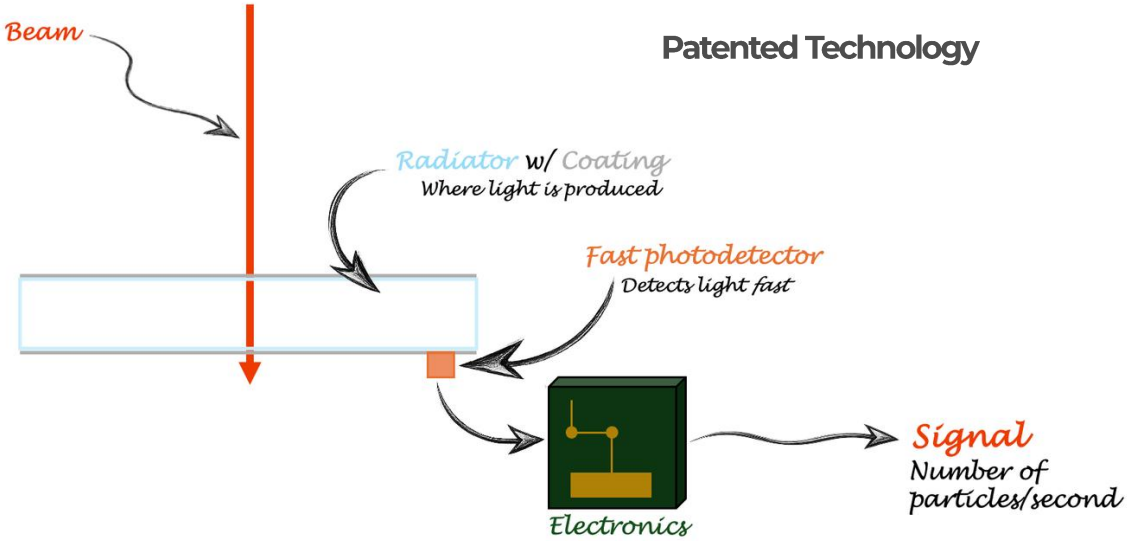
LIP - Laboratório de Instrumentação
e Física Experimental de Partículas
Partículas e Tecnologia

FLASH Radiotherapy: A breakthrough waiting to happen

The problem: Needs a beam monitoring device before being used in clinic!

FLASHGuard

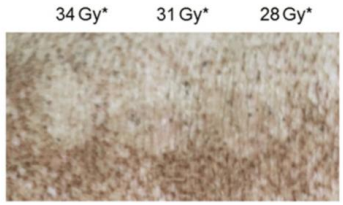
Cherenkov Effect Particle Counter



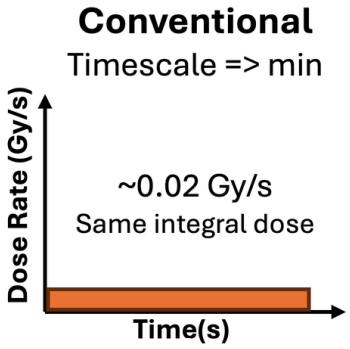
FLASH Radiotherapy: A breakthrough in cancer treatment

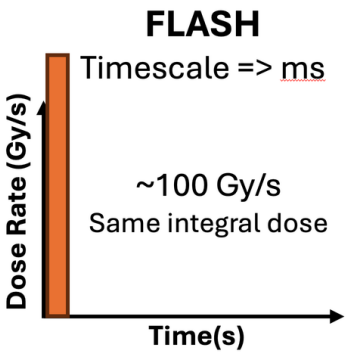
Dose delivered 1000 times faster protects healthy tissues!

Conventional Mode



FLASH Mode





	Conventional	FLASH
N° Sessions	~20 to 30	1
Duration	Weeks	Single Visit
Tumor Control	Same Effectiveness	
Toxicity and Side Effects	Reduces patient side effects significantly, leads to improved QoL	
Substitution Potential	50% of Cancer treatments use Conventional Radiotherapy	

Strategy and Vision

IP Strategy

Protection of the company's IP is a priority and an asset

- **Foundational patents** covering key concepts, reinforced by **trade-secret protection** for critical know-how.
- **Company owned IP by design:** all employees and collaborators sign NDAs.
- Seeking **international specialized legal support,** advising on IP strategy, structuring and long-term protection.

Exit Strategy

Clear exit paths aligned with technology maturity and market adoption.

- A strong IP strategy ensures **full control over core concepts and products,** enabling **flexible licensing and exit options.**
- Our plan is to advance the technology to TRL 7, validating industrial readiness. **Exit via licensing or strategic acquisition by a leading industry player** with established manufacturing, regulatory, and global distribution capabilities.

FLASH Radiotherapy is a disruptive treatment.
RTBEAMTECH develops the technology that enables its clinical implementation.

PicoMoni

- To detect particles in the beam using LGADs
- LGADs have timing resolution in sub-nanosecond scale
- 1 PhD in co-supervision with HIT

Activities

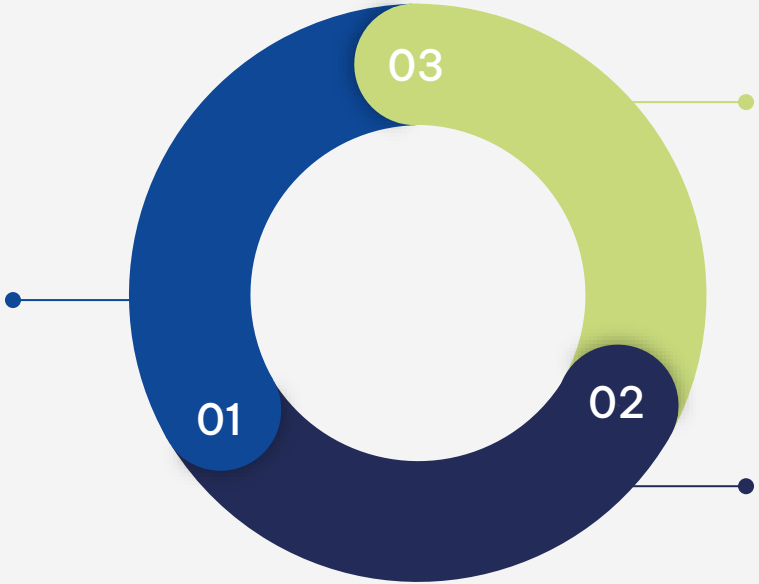
- Activities mainly related to technology development for beam control and monitoring with very fast detectors and electronics

- Three main activities at this moment:

  - BoneOscopy
  - FlashGuard
  - PicoMonitoring

Prefer visual contents

Be creative in how you share information and keep the audience focused on your presentation, there's more to it than bullet points!



Use narratives

Tell stories or share examples that illustrate the relevance and impact of the information you're sharing. This will help you engage your audience and make the information easier to remember.

Promote dialogue

Include the audience in your presentation, allow time for questions and answers, promoting interaction and dynamism.

Modify the layout

Make slight changes to the layout of your presentation

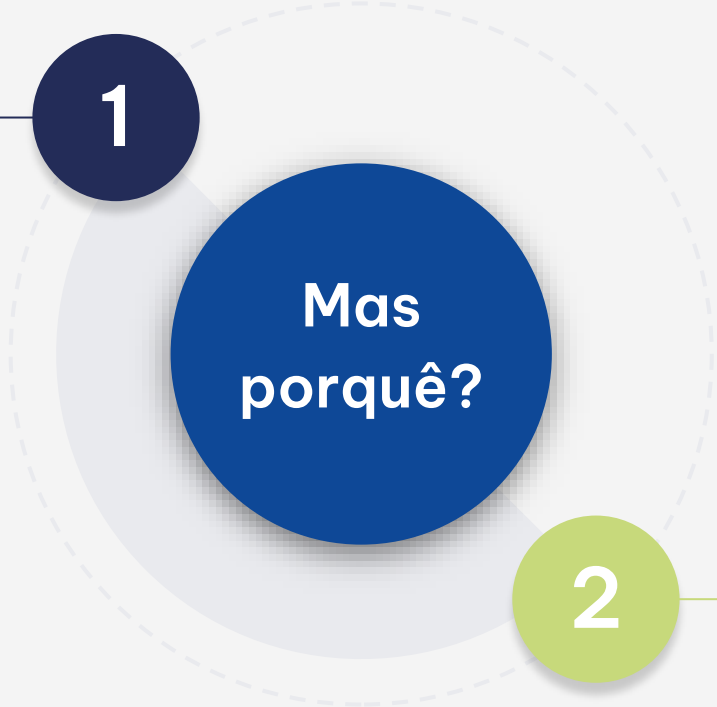
- This prevents your audience from getting bored and losing focus on the information you are sharing.
- It also shows that you have taken care with the way you present the information.
- Remember that some topics may require more graphic emphasis, while others will be better explained with examples, stories, or images. Changing the layout allows you to tailor the presentation to the specific needs of each topic.

Use contrast

Use contrast

Because this way you can highlight important information such as key points or essential elements.

1



2

Appropriate contrasts between text and background, or between graphic elements, improve readability and facilitate understanding of the content.

Photos?

Use the same principles as in slide 3 and consider the following points

- **Copyright:** Make sure you have permission to use the images that are included in the presentation, or use images in the public domain or with Creative Commons licences.
- **Image quality:** Use high-quality images to ensure that they are sharp and clear in the presentation. Avoid pixelated or low-resolution images, which end up damaging the visual experience.
- **Relevance:** Images should be relevant to the content of the presentation and support or reinforce the message being conveyed. Irrelevant or disconnected images can confuse the audience and distract them from the main topic.

Photos?

Examples

- If you need to overlay text on an image, ensure that it is legible and contrasting enough to stand out.
- Avoid using images with too much information, as this makes the text difficult to read.

Photos?

Examples

short caption

short caption

short caption

Photos as background?

It is possible, but more difficult to compose.

Well-chosen and appropriately presented images can make your presentation more engaging and memorable for your audience.

- Select a layout that suits the image you are using.
- Use as little text as possible and ensure that it is legible.