



AGÊNCIA NACIONAL
DE INOVAÇÃO

CERN and Portuguese Industry

Trends and future developments

15 . 09 . 2023

RECFA Visit to Portugal



AGÊNCIA NACIONAL
DE INOVAÇÃO

The National Innovation Agency (ANI) manages national funding and tax incentive programmes for R&D, EU programmes (Horizon Europe) and other support measures to collaborative initiatives between Academia and Industry.

I am the Portuguese Industrial Liaison Officer (ILO) for **CERN**, **F4E/ITER** and **ESRF** (since 2019); previously also for ESO and SKAO; informally for ELI, ET, FAIR.

Recently, started collaborating with the TIARA consortium, as member of the “**ASc&T Industry Permanent (AIP) Forum**”



Industrial Return – the most basic metric

- Portugal pays an annual membership fee to CERN (~CHF 13M);
- CERN uses 30-40% of that to purchase supplies and industrial services;
- For a “fair” industrial return, we should expect CERN to spend ~CHF 3M/year in Portugal.



Industrial Return – the most basic metric

- Portugal pays an annual membership fee to CERN (~CHF 13M);
- CERN uses 30-40% of that to purchase supplies and industrial services;
- For a “fair” industrial return, we should expect CERN to spend ~CHF 3M/year in Portugal.

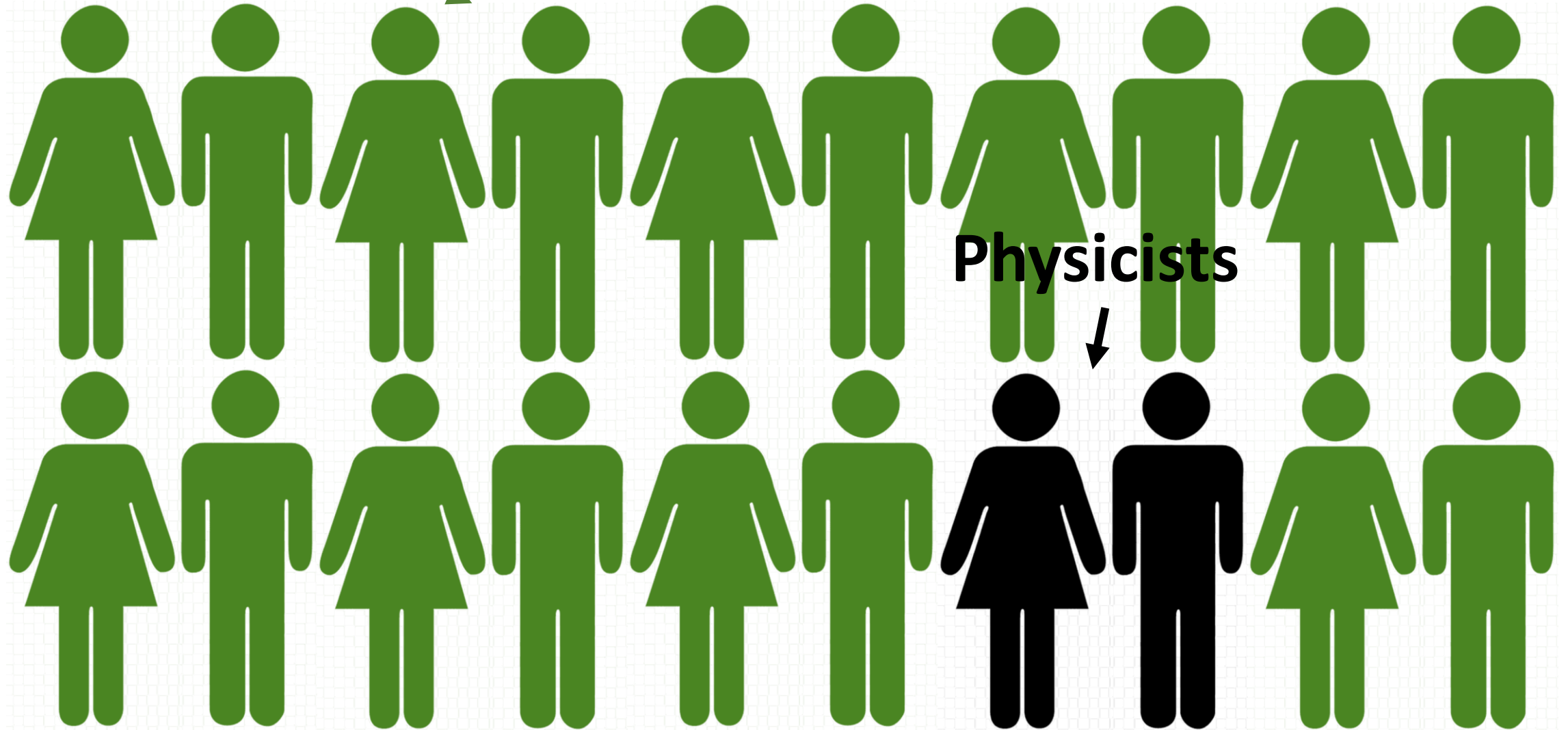
Sales

Knowledge
Transfer

Training

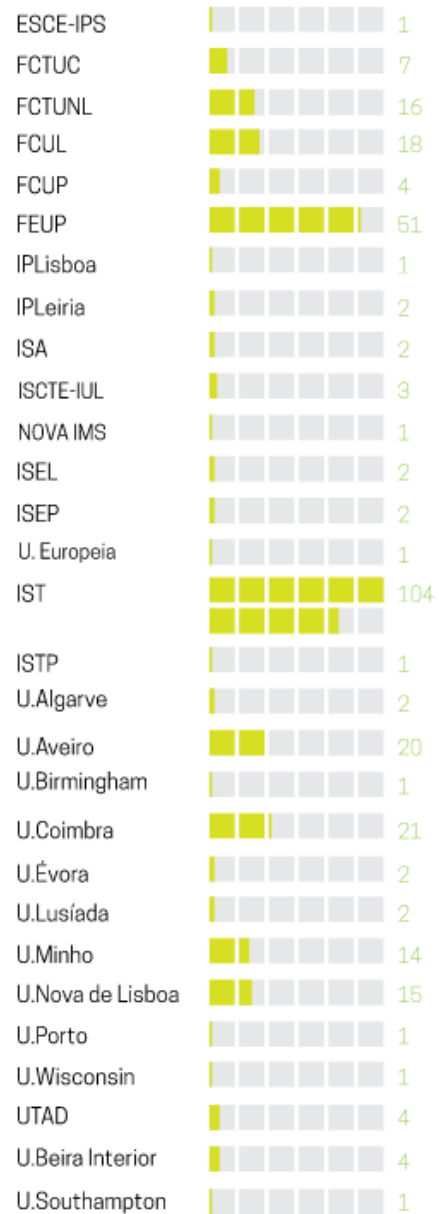
Engineers

Is CERN for Physicists only?



Physicists

The FCT CERN Trainee scheme

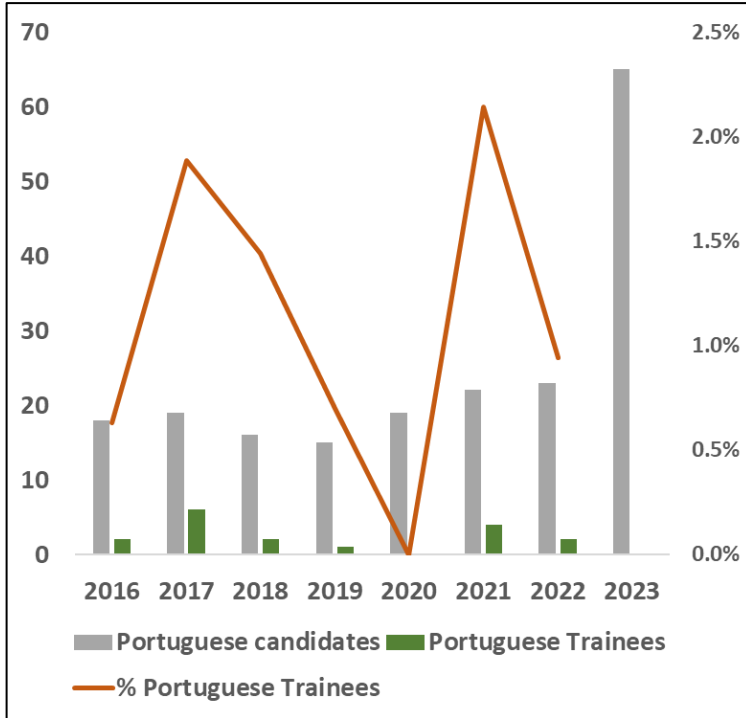


- Wide target: BsCs, MsCs, PhDs, from **many backgrounds**;
- *1 year studentship, extendable to 2y*;
- *4 hosting Orgs: **CERN, ESO, ESA, EMBL***;
- *Since 1996, **300+** students benefited (**almost 200 @CERN**)*;
- ***Scheme discontinued in 2019.***





Technical Students/Interns – CERN programme



- 10-fold* increase in Portuguese candidates for **CERN Tech Students** programme in 2023;
- First-ever 2 Portuguese **Interns at ITER**.

In December 2022, I emailed the coordinators of 100+ MsCs in all Portuguese universities, asking to share information with students about CERN and ITER internship opportunities



- **Students WANT to go to CERN**
- **FCT does not seem to have plans to reactivate the domestic trainee programme**
- **ANI studying alternatives to help filling that void in offer**

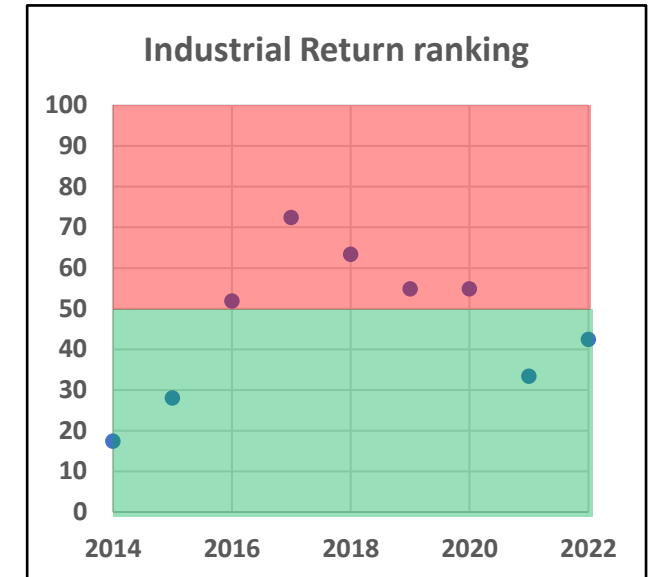
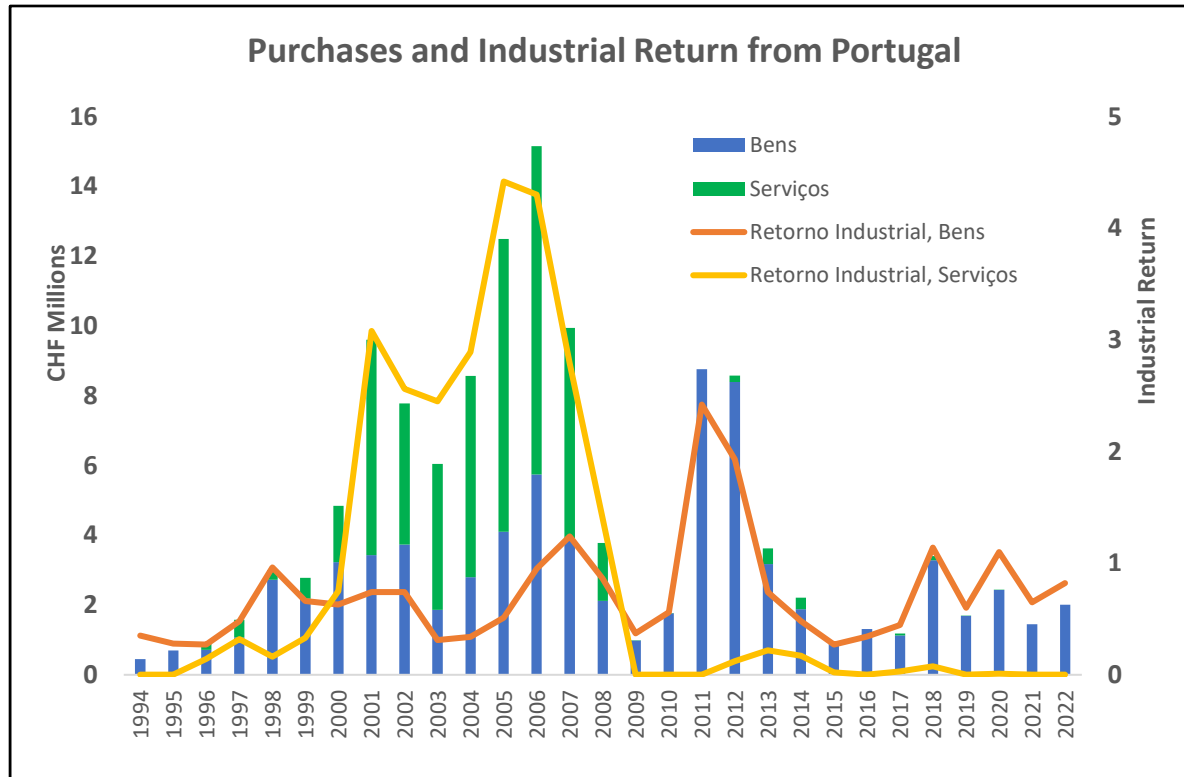
Industrial Return – the most basic metric

- Portugal pays an annual membership fee to CERN (~CHF 13M);
- CERN uses 30-40% of that to purchase supplies and industrial services;
- For a “fair” industrial return, we should expect CERN to spend ~CHF 3M/year in Portugal.

Sales

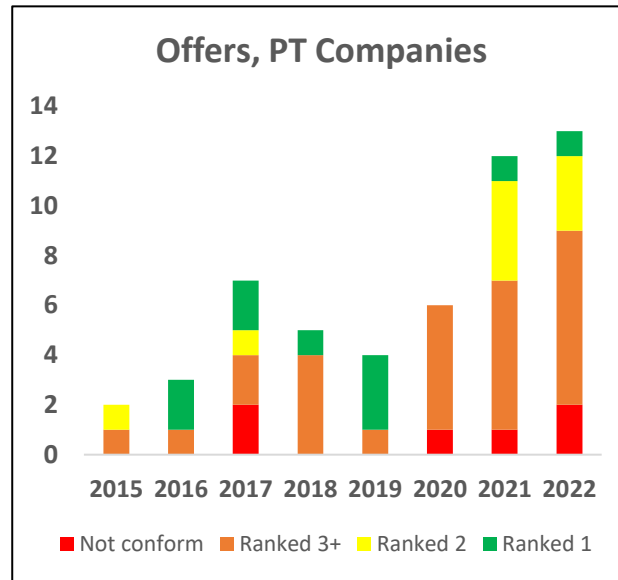
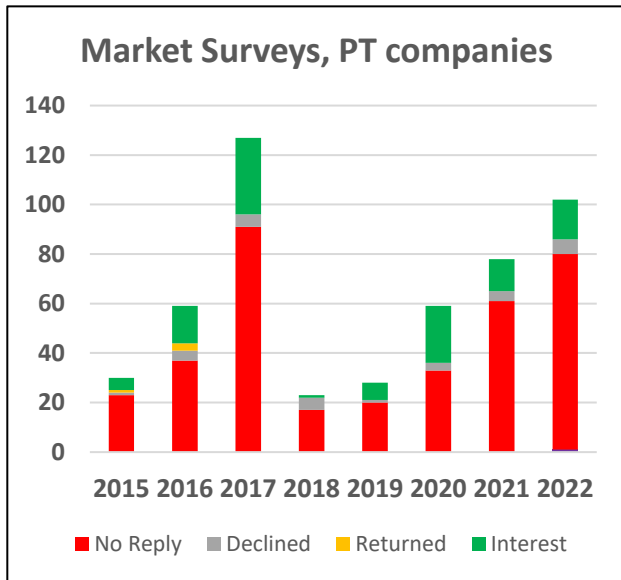
Training

Portuguese Industrial activity with CERN

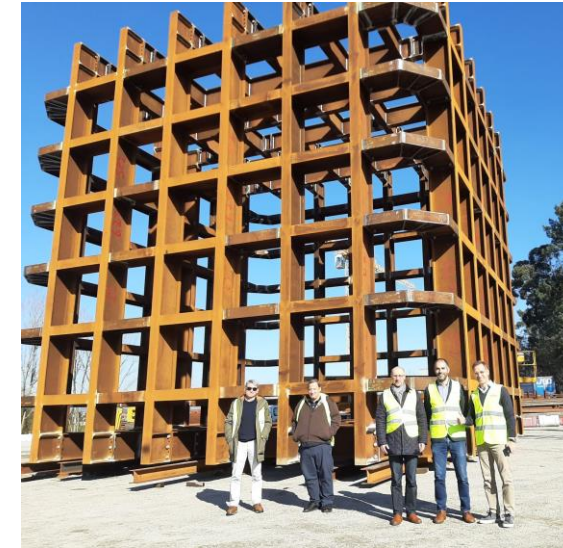


- Portuguese industry's performance at CERN has varied between outstanding and average over the past 30 years;
- Outstanding performance during LHC construction, due to Efacec, ISQ, A. Silva Matos, Setrova;
- Mostly poorly balanced over the past 10 years.

Recent Industrial activity trend - UP



DARKSIDE Cryostat structure



bysteel
building the future

- Increased interest from Industry since 2018;
- Very few competitive contracts won, but several near-misses (ranked 2nd) for high-value contracts;
- Slight improvement for 2023, with 2 (maybe 3) winning bids so far.

Cascading effects of CERN in Portuguese Industry

FUSÃO NUCLEAR

Fusão nuclear: ISQ assina contrato de 16 milhões de euros para o projecto ITER

O reactor de fusão nuclear ITER está a ser instalado em Cadarache, no Sul de França.

Lusa

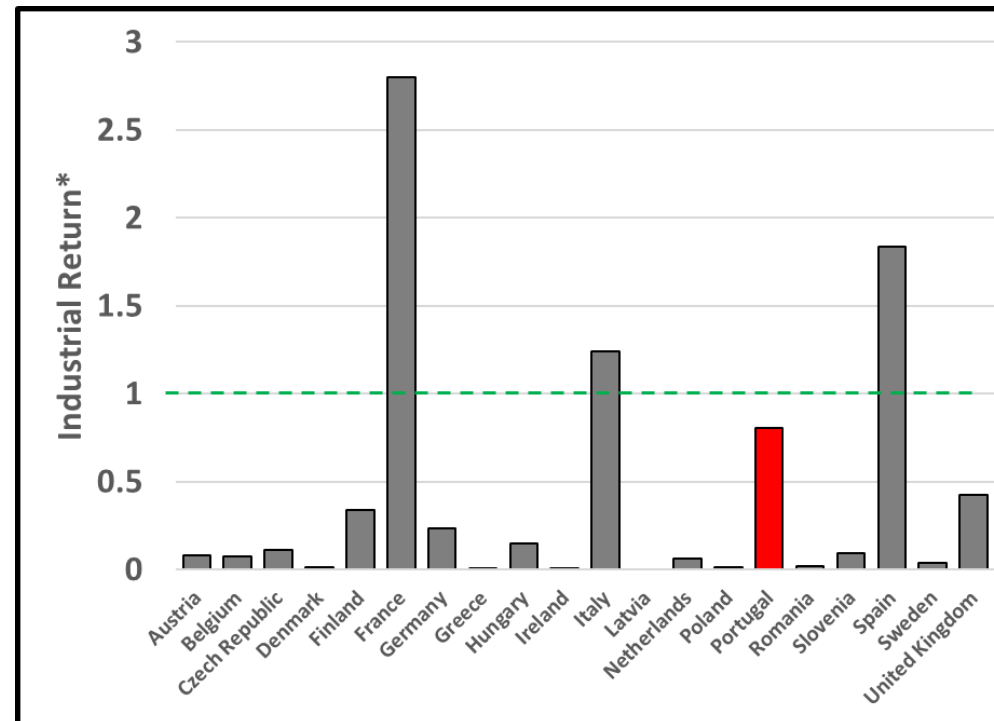
3 de Maio de 2023, 15:28

Receber alertas



Modelo do que será o reactor de fusão nuclear ITER, que ficará no Sul de França NELSON GARRIDO

Industrial Return*, Fusion for Energy



- CERN has been a qualification ground for a few Portuguese companies, opening a new market – Big Science – for them.
- >€30M in Big Science contracts in past 15 years would have been unlikely without CERN membership

CERN is the tip of a Big Science market iceberg



china eu india japan korea russia usa



AGÊNCIA NACIONAL DE INOVAÇÃO

266415-2023: Germany-Hamburg: Metal detectors

from Big Science v.1

Publication date (PD): 03/05/2023 | Deadline (DT): 06-06-2023 | Document (TD): Contract notice

★ Send To > Keep unread Delete

261421-2023: Germany-Cologne: Laboratory, optical and precision equipments

from Big Science v.1

Publication date (PD): 02/05/2023 | Deadline (DT): 29-05-2023 | Document (TD): Contract notice

★ Send To > Keep unread Delete

257584-2023: Germany-Dresden: Laboratory, optical and precision equipments

from Big Science v.1

Publication date (PD): 28/04/2023 | Deadline (DT): 30-05-2023 | Document (TD): Contract notice

★ Send To >

252565-2023

from Big Science

Publicat

★ Send To >

241104-2023

from Big Science v.1

Publication date (PD): 24/04/2023 | Deadline (DT): 31-05-2023 | Document (TD): Contract notice

★ Send To > Keep unread Delete

246294-2023: Belgium-Brussels: Detection and analysis apparatus

from Big Science v.1

Publication date (PD): 25/04/2023 | Deadline (DT): 30-05-2023 | Document (TD): Contract notice

★ Send To > Keep unread Delete



MAX-PLANCK-INSTITUT
FÜR CHEMISCHE PHYSIK FESTER STOFFE



GSI Helmholtzzentrum für Schwerionenforschung



Monitoring of the Iceberg bottom
20-50 Contract Notices/week

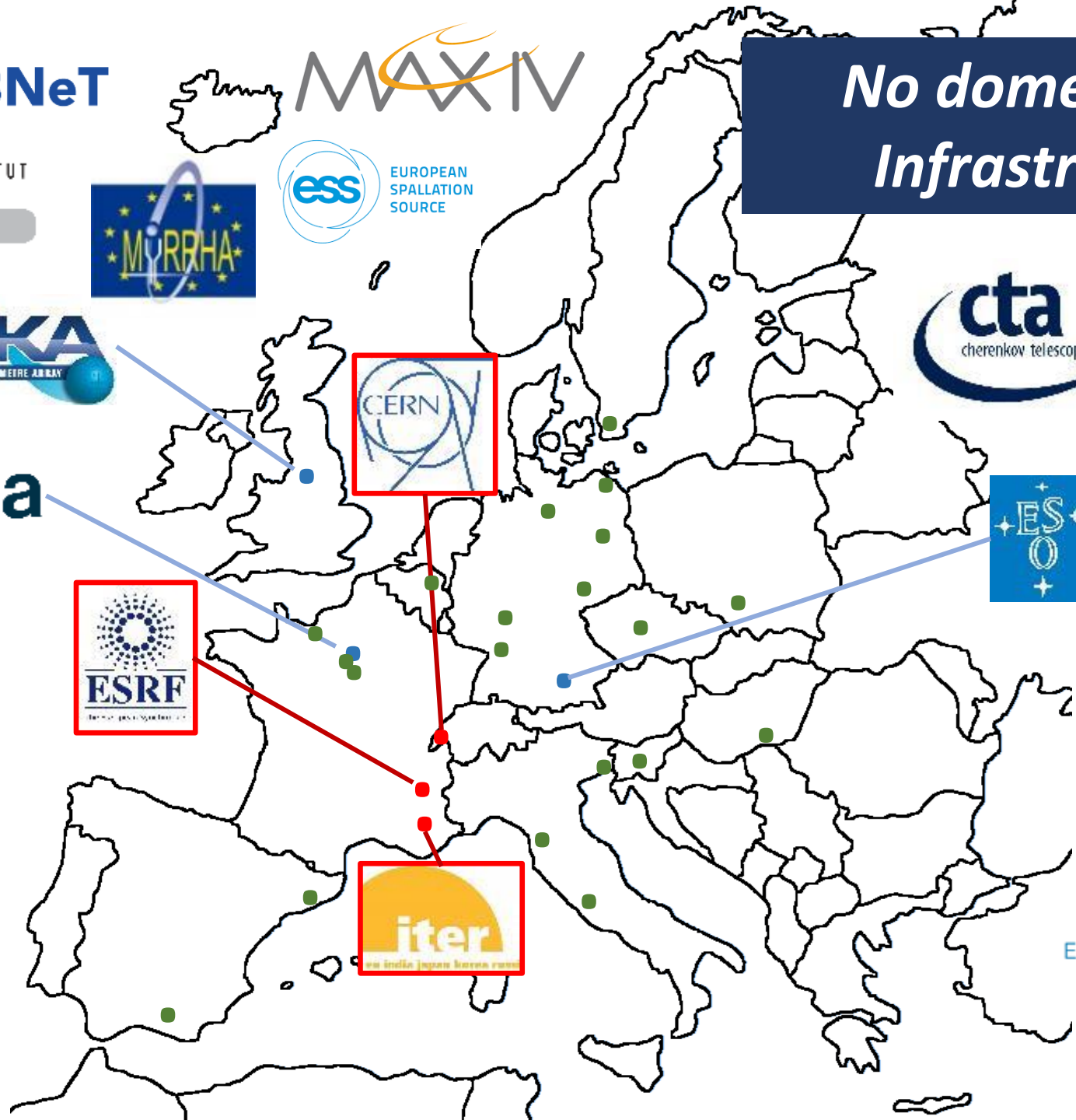
There's limited capacity in the Portuguese Industrial ecosystem to deliver many of the higher-tech needs



PAUL SCHERRER INSTITUT



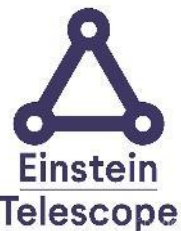
No domestic large Research Infrastructure in Portugal



SOLARIS NATIONAL SYNCHROTRON RADIATION CENTRE



Elettra Sincrotrone Trieste



Einstein Telescope



Max Planck Institute for Plasma Physics

Leveraged investments from national streams (low)

Collaboration Agreements for International Collaboration

Country	Nb agreements
Spain	32
Poland	29
Portugal	18
Italy	13
United Kingdom	13
Germany	12
Greece	10
France	8
Switzerland	7
Hungary	3
Finland	2
Lithuania	2
Austria	1
Belgium	1
Czech Republic	1
Norway	1
Pakistan	1
Ukraine	1
Total	155

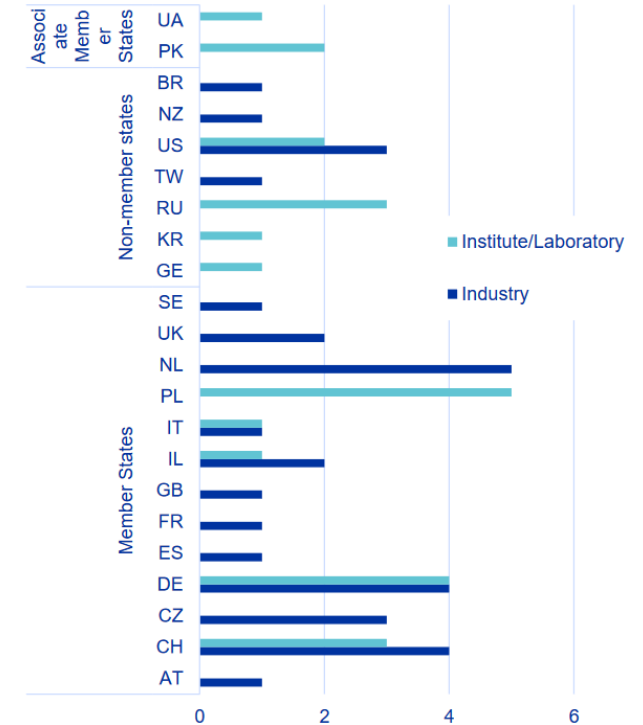
Mike Lamont, FC Dec. 2021

Collaboration Agreements for R&D and Projects

In kCHF

Country	CERN cash contribution	CERN in-kind	Institute	Total
ES	6,751	10,608	19,991	37,350
IT	11,347	4,781	16,323	32,450
GB	13,298	144	11,330	24,772
FR	5,603	1,139	5,863	12,605
CH	5,083	1,867	4,741	11,691
DE	3,776	350	3,458	7,585
PL	158	500	581	1,239
HU	0	438	751	1,189
AT	316	27	199	542
SE	286	0	0	286
GR	109	9	109	227
NL	187	0	0	187
NO	160	0	0	160
IL	55	0	54	109
FI	109	0	-2	107
LV	54	0	0	54
TR	0	25	22	47
PT	13	0	0	13
Total	47,305	19,888	63,421	130,613

Licensing Agreements* (KT)



Joachim Mnich, FC Dec. 2021

- Portuguese interest in CERN as a HR development centre;
- Lack of investment on leveraged collaborative agreements;
- Limited capacity to forge close links between Labs and Industry on *in kind* supplies.

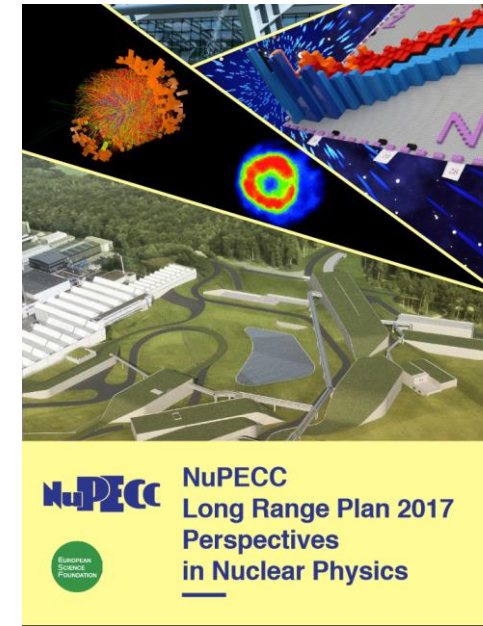
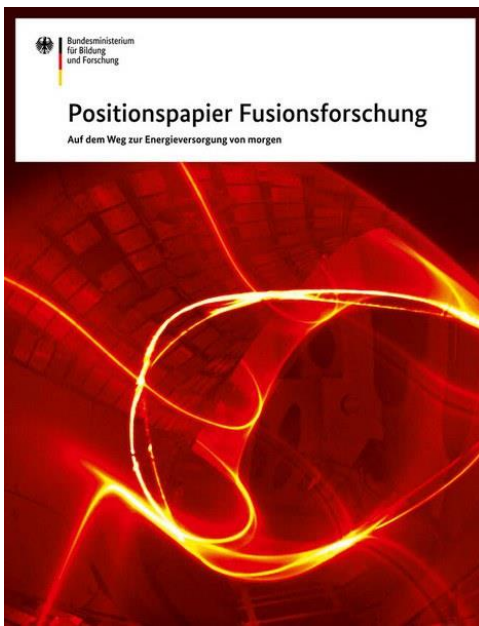
What can be done differently?

Mindset Opportunity Leveraging

- CERN should be seen as an integral part of the national R&D&I ecosystem.
- CERN membership is a permanent reservoir of Industrial development potential.
- The more investment Portugal can mobilize domestically, the more its industry will benefit from CERN membership.
- CERN is the best launching pad for the Portuguese industry to the Big Science market.

Aligning Industry, National Labs and EU Roadmaps

- **Human Resources**
 - Traineeships CERN*-Industry (PT)
 - Industry PhD Theses
- **Collaborative R&D**
 - Strategic Roadmaps-aligned projects (Labs+Industry)
- **In kind support**
 - Framed as CERN Collaborative Agreements (OR)
 - Membership contributions to new Research Infrastructures



Pre-invite for National events

Q4 2023 (tentative: November 28, Porto)

Partnering event between Industry and Research groups involved in the development of Big Science technologies.

Immediate objectives: development of PhD thesis proposals (2024 FCT call), building of consortia for R&D projects, other collaborative initiatives.

Q1/2 2024 (tentative: Lisboa)

- EU *Big Science* Technology Roadmaps
- IFAST, AIDA, LEAPS, EUROFUSION (...)
- Portuguese Research/Engineering Laboratories

Objectives: Broadening the reach of Big Science organizations in the Portuguese R&D ecosystem, leveraging capacities for technological challenges.

OBRIGADO

jose.anta@ani.pt



www.ani.pt



UNIAO EUROPEIA
Fundo Europeu
de Desenvolvimento Regional