

TIARA, kickoff Meeting

2011 February 23 and 24
CERN



MINISTERIO
DE CIENCIA
E INNOVACIÓN

Ciemat
Centro de Investigaciones
Energéticas, Medioambientales
y Tecnológicas



Index

- ✓ CIEMAT short presentation
- ✓ Infrastructures
- ✓ Number of students and resources for
accelerator science training



✓ CIEMAT = Public Research Centre of the Ministry of Science and Innovation

✓ Founded in 1951

✓ Shareholder in

[ENRESA \(Empresa Nacional de Residuos Radiactivos\)](#)

[ENUSA Industrias Avanzadas, S.A](#)

[Fundación CENER-CIEMAT](#)

[Fundación Parque Científico de Madrid](#)



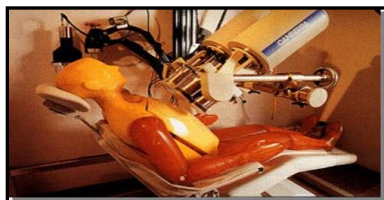
✓ CIEMAT is defined as a Public Research Agency for excellence in energy and environment, technologies and fundamental research.

✓ Dedicated to transfer the capabilities and research results to the industry and society through E & T activities

- **Promote and extend** the R&D activities derived from the directives of our Mission
 - **Be a centre of reference** for national and international scientific and technical communities
 - **Collaborate** with other research centres
 - **Integrate activities** and cooperate with other research centres and countries
 - **Provide technical services** in the areas within its competence.
- **Foster activities derived from its R&D in the fields of scientific-technical diffusion, training and technology transfer**



Areas of Activity



Energy

Environment

Technology

Basic Research

Fusion by Magnetic Confinement

Knowledge Transfer

Safety and Decommissioning

Radiation Protection

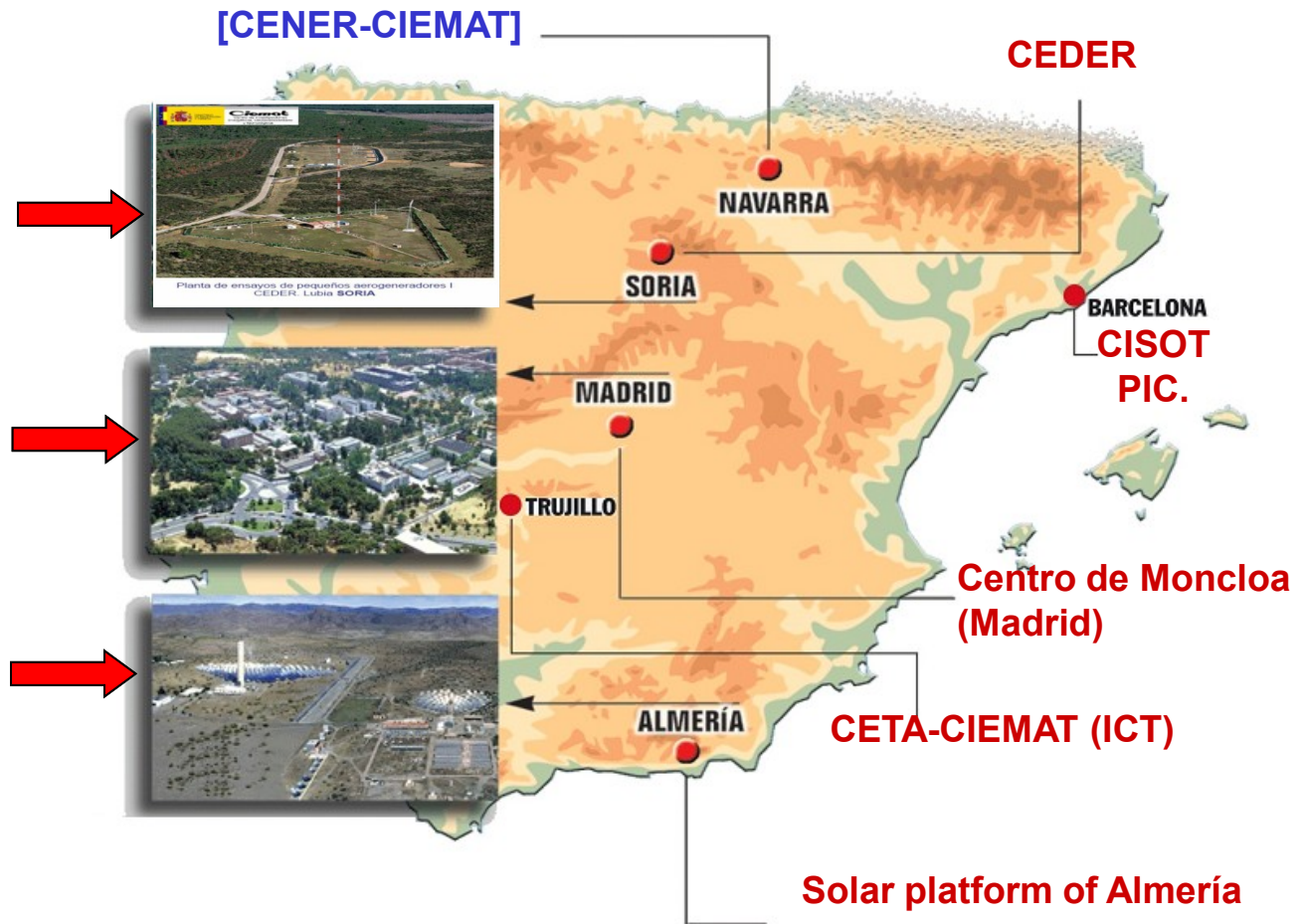
**Standard Laboratory in the field of
metrology of ionising radiations**

CIEMAT sites (related to R&D in energy)

Pilot-Scale
Demonstration-Scale

Basic studies
Laboratory-Scale
Bench-Scale

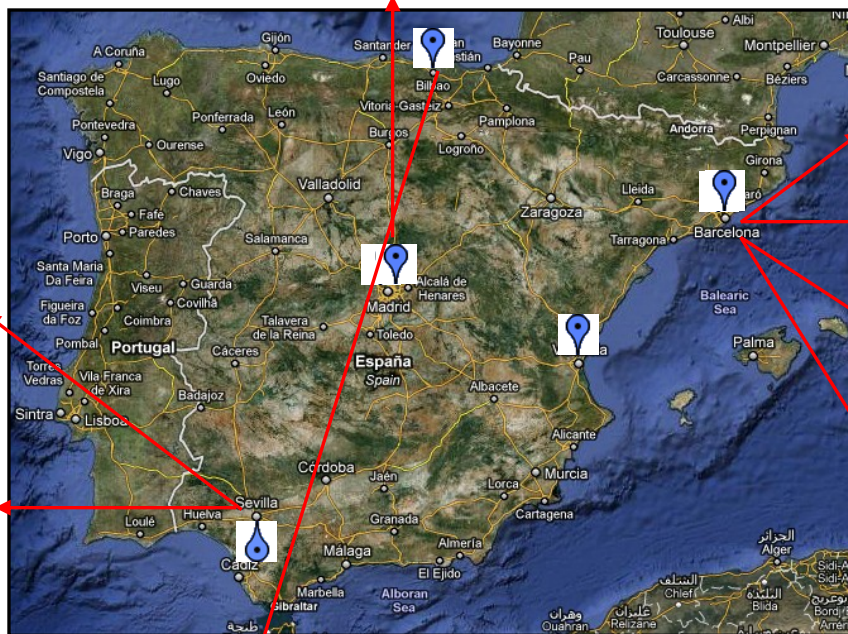
Pilot-Scale
Demonstration-Scale



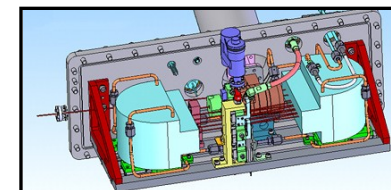
Infrastructure and Accelerator research area



**Tandem 5MV
(Cockcroft-Walton).**



**Synchrotron Light
Facility, 3GeV**



**Microtron,
6,8,10,12 MeV.**

**Tandem 3MV
(Peleton), and 1MV
(Cockcroft-Walton)**



**Poyect: Linac 50 MeV,
 H^+ , H^-**



Industrial & medical area



▪ MEDICAL AREA:

240 Lineal accelerators in Spain by Comunidades Autónomas.



21 ACCELERATORS TO RESEARCH, INDUSTRY & F18 PRODUCTION.



Resources for accelerator science training




1. Undergraduate: Subjects:

- ✓ *Synchrotron engineer*: ~20 Students, 20 hours, UPC
- ✓ *Working and application of particles accelerator*: ~25 Students, 60 hours, UPC



2. Master:



- ✓ *Synchrotron radiation and particles accelerator*: ~ 9 students, 60 ECTS, UPC, UAB, UB, ALBA CELLS.
- ✓ *R&D of industrial technology*: ~36 students, 60 ECTS, UNED  **Subjects:**
 - ✓ *Security and environment impact of nuclear fusion facilities.*
 - ✓ *Technologies for nuclear waste management and disposal.*
- ✓ *Nuclear engineering*: ~ 25 students, 60 ECTS, CIEMAT-UAM  **Subjects:**
 - ✓ *Particle accelerators*
- ✓ *Physics engineering*: ~Next year, ESS Bilbao -UPV/EHU  **Subjects:**
 - ✓ *Control and instrumentation for p.a.*
 - ✓ *Components and power systems for p.a.*
 - ✓ *Neutron techniques.*
 - ✓ *Industrial, medical and research facilities.*
 - ✓ *Radiological protection.*

3. PhD:

Institution	CIEMAT	IFIC	UNED	UPC	ESS Bilbao	ALBA
Number of PhD	5	4	3	3	7	*

(*) Pending to receive information.



Resources for accelerator science training

4. Collaborations:



- ➔ Join Universities Accelerator School: ♦ Contribution of spanish universities, UPC, UV and UAB
- ➔ Program of specialiation on scientific facilities and intertational organism with the suport of MICIN:

Institution	CERN	ITER	DIAMOND	ESRF
Students	5	1	1	2
Institution	FAIR	INFN	CLF-RAL	
Students	1	1	1	

5. Training and transfer of knowledge between research centres:



- ♦ Accelerators
- ♦ Lines/experiments of synchrotron light
- ♦ Other technical tasks, like computing

6. Text books:

- ✓ Yuri Kubyshin: “Acceleradors de partícules. Problemes”.
- ✓ Yuri Kubyshin: “Acceleradors de partícules. Vocabulari català-castellà-anglès”.



But, where are our students?



- ◆ Number of students selected for the Technical and Doctoral Student Programme by nationality over 5 years at CERN (*).

	AT	BE	BG	CH	CZ	DE	DK	ES	FI	FR	GB	GR	HU	IT	NL	NO	PL	PT	SE	SK	NMS	Total
2005	8		2	1	2	6	2	15	2	10	4	2	1	11	1	10	17	2	2			98
2006	12		1		3	6		11	1	19	5	4	4	21	1	16	15	7	11			137
2007	6	2	2	3	2	38		14	1	14	4	3	3	20	3	11	14	6	8		5	159
2008	21	2	5	2		27	1	18	6	10	5	9	1	17	1	14	17	3	5	4	4	172
2009	15	5	2	3	2	36		23	8	13	3	16	3	18	2	12	16	3	5	1	4	190
Total	62	9	12	9	9	113	3	81	18	66	21	34	12	87	8	63	79	21	31	5	13	756

(*) Statistics provided by CERN Human Resources



Most of them use to go abroad...



With our most sincere thanks to



Centro de Investigaciones Energéticas, Medioambientales y Tecnológicas: Susana Falcón, Marisa Marco, Diego Obradors.



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Dr. Yuri Koubychine



Alba Cells: Dr. Gastón García,
Dr. Alejandro Sánchez and more...



Universidad Nacional de Educación a Distancia:
Dr. Javier Sanz, Dr. Patrick Sauvan



Centro de Microanálisis de Materiales:
Dr. Ángel Muñoz



Instituto de Física Corpuscular:
Dra. Ángeles Faus



European Spallation Source Bilbao:
Dr. Javier Bermejo



Universitat Autònoma de Barcelona:
Dr. Manel Sabes



Centro Nacional de Aceleradores:
Dr. Joaquín Jose Gómez

MICIN: Ministerio de Ciencia e Innovación UV: Universitat de Valencia

UPV/EHU: Universidad de País Vasco /
Euskal Herriko Unibertsitatea

Thank you



UAB

Ciemat

CNA



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bilbao**

