

**Materia a Alta Presión – MALTA  
CSD2007-00045**



- 1) Resumen del Proyecto MALTA
- 2) Composición del Equipo y Estructura Operativa
- 3) **Ámbito de la Investigación y Objetivos Estratégicos**
  - Programa Científico
  - Programa de Transferencia Tecnológica
  - Programa de Cooperación e Internacionalización
  - Programa de Formación
- 4) Red de Infraestructuras MALTA
- 5) Indicadores de Calidad del Proyecto: 2008-2010
- 6) Perspectivas del Proyecto MALTA-Consolider

# Resumen del Proyecto

La iniciativa Materia a Alta Presión pretende incorporar a España al grupo de países líderes en la investigación a altas presiones, con el fin de que, a medio plazo, la sociedad española pueda beneficiarse de los avances derivados del conocimiento y control de esta singular tecnología de brillante presente y prometedor futuro.

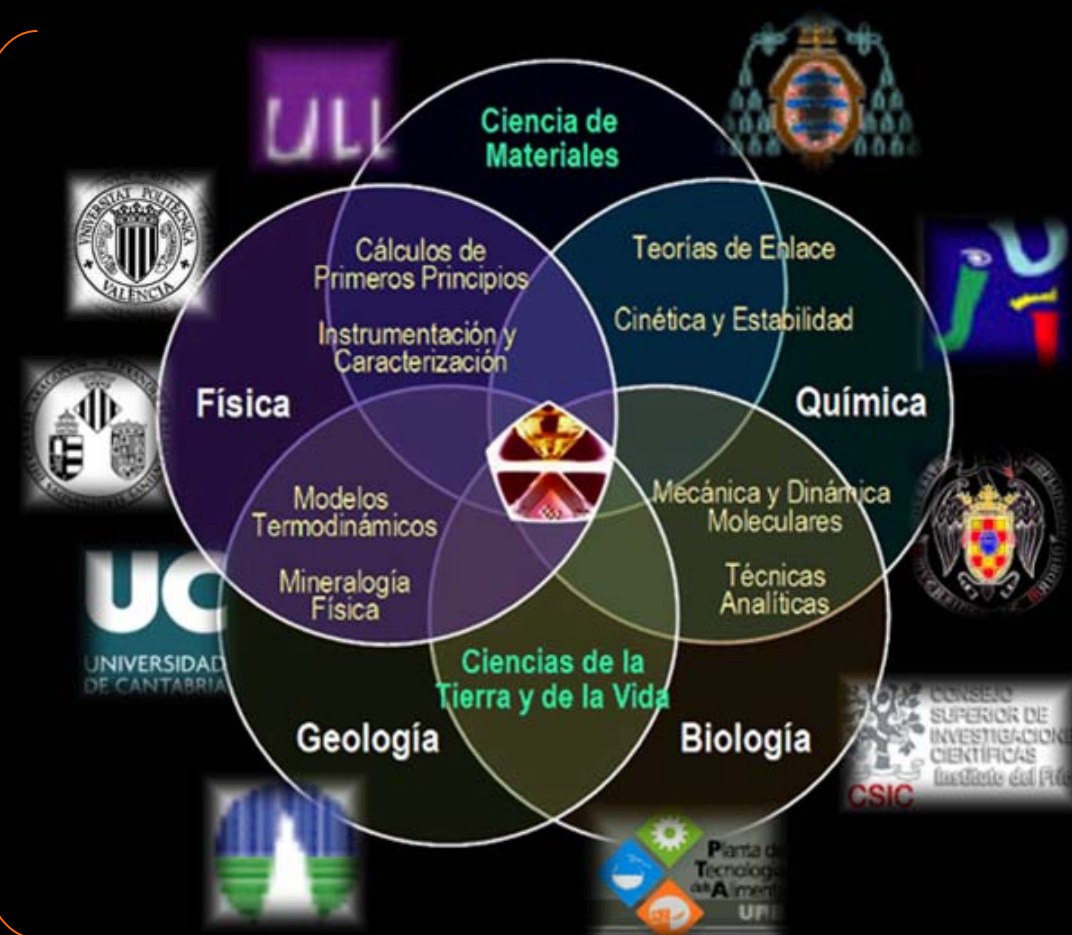


Alta Presión: Área Interdisciplinar

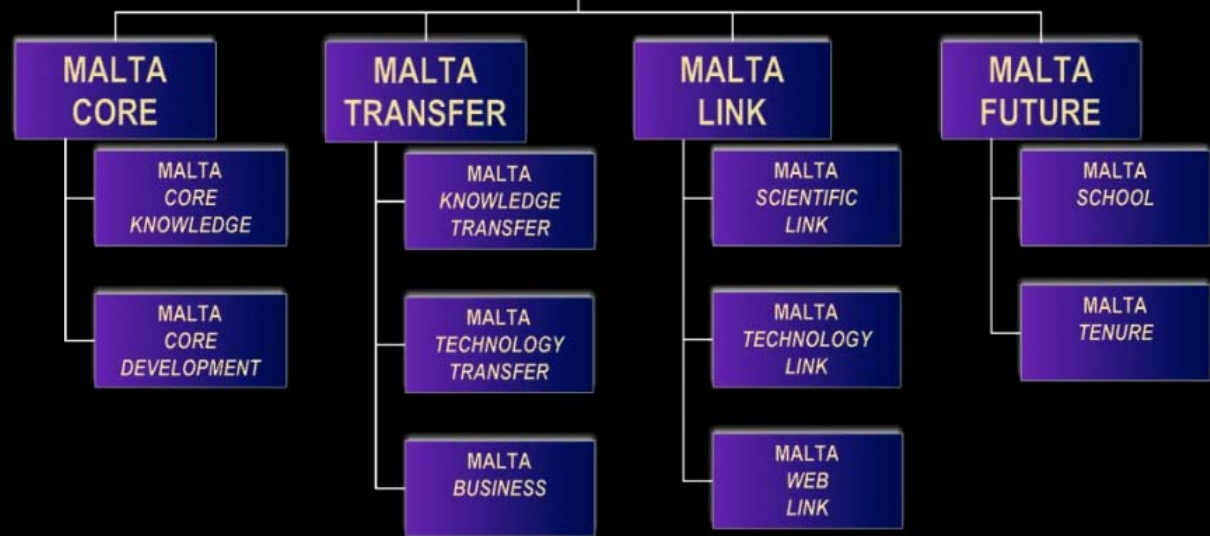
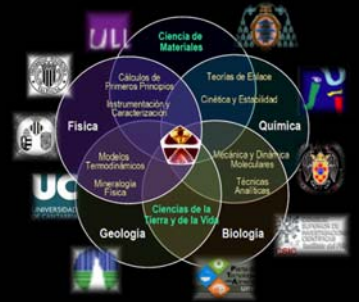


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11 Grupos  
80 Científicos



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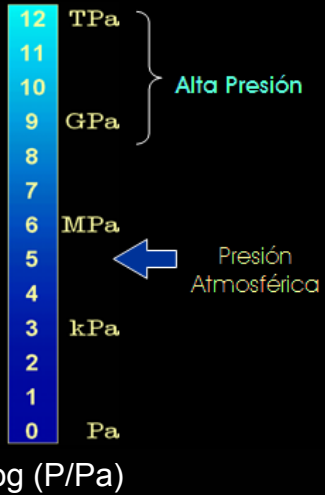
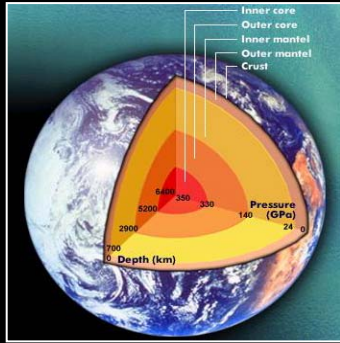


Objetivos Científicos

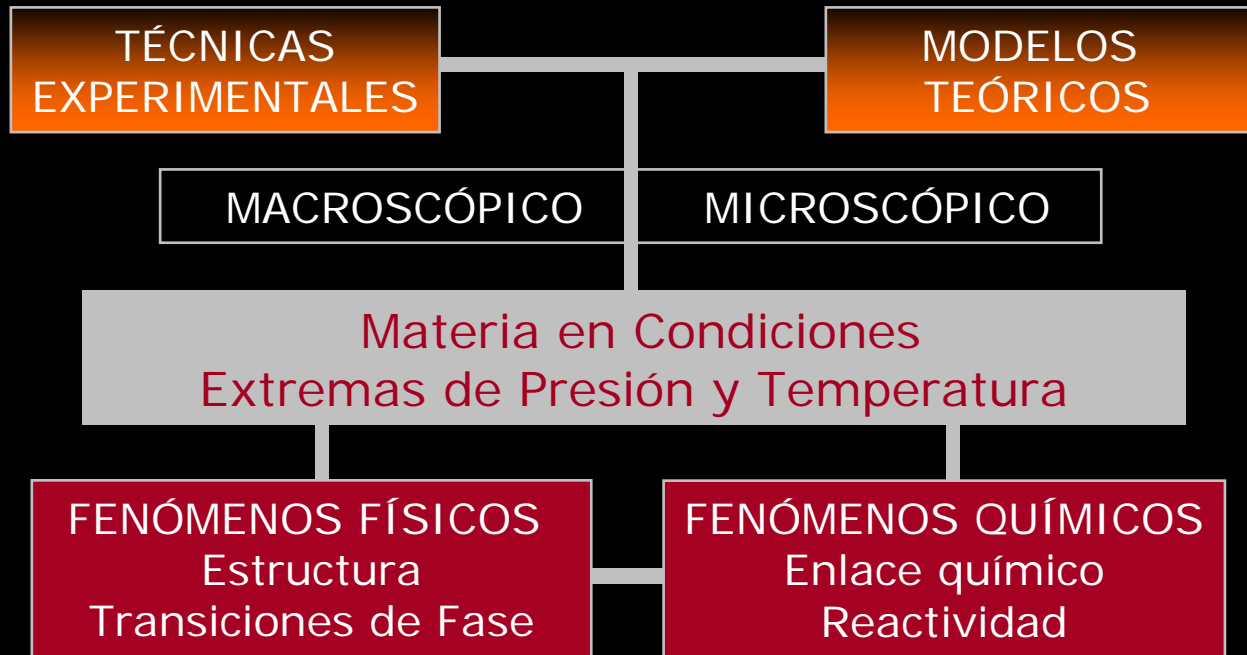
Transferencia Tecnológica

Cooperación Científica

Transferencia Conocimiento



## P y T: variables "naturales"



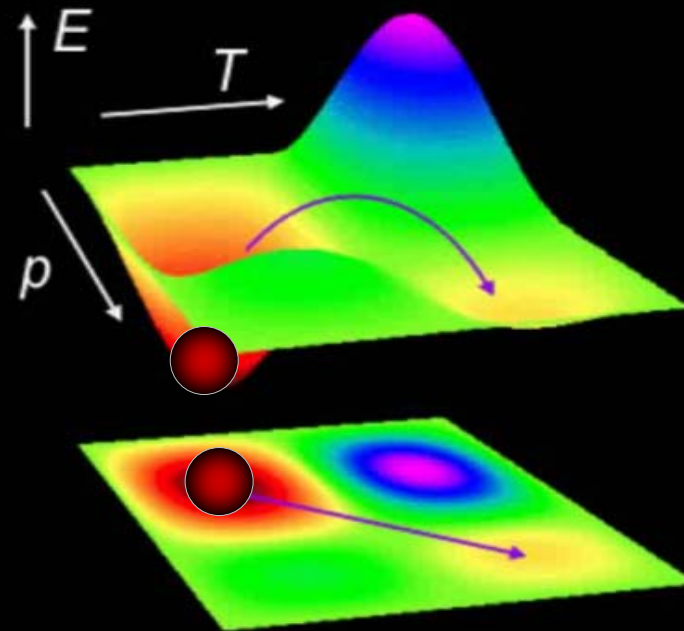


## PRESIÓN

Estructura- Geometría  
Estructura Electrónica

## TEMPERATURA

Estructura  
Fonones (vibraciones)  
Mezcla est. electrónicos



- Cambios en Geometría, Conformación, Agregación
- Transformaciones de Fase
- Síntesis de Nuevos Materiales
- Inactivación Microbiana
- Nuevos Procesos Tecnológicos
- ...



## Red de Infraestructuras MALTA (2 Millones €)





## MALTA CORE

MALTA  
CORE  
KNOWLEDGE

MALTA  
CORE  
DEVELOPMENT

## MALTA TRANSFER

MALTA  
KNOWLEDGE  
TRANSFER

MALTA  
TECHNOLOGY  
TRANSFER

MALTA  
BUSINESS

## SCIENTIFIC GOALS

- I. **Water and life-related systems**
  - a. Synthesis, properties and stability of ice clathrates
  - b. High pressure effects on aqueous solutions of supramolecular aggregates and proteins
  - c. Microbiology under extreme conditions of pressure and temperature
- II. **Molecular systems: physical properties and chemical reactivity**
  - a. Pressure as a probe on unsaturated NOCH systems
  - b. Pressure-induced reactivity on NOCH materials
- III. **Structure, stability, and reactivity of minerals**
  - a. Pressure-Temperature-Composition (PTx) diagrams and physical properties of:  $ABO_3$  ( $AO-BO_2$ ),  $ABO_4$  ( $AO_2-BO_2$ ) and  $AB_2O_4$  ( $AO-B_2O_3$ ) oxides
  - b. Catalytical properties of minerals on abiotic organic synthesis

## TECHNOLOGICAL GOALS

- IV. **Development of new high pressure cells: anvil and large volume devices**
- V. **Development of new optically active materials as pressure and temperature sensors**
- VI. **Design of a novel laser heating system for diamond anvil cells**
- VII. **Implementation of diagnostic devices in high pressure industrial equipments**

## COOPERATION AND OUTREACH GOALS

- VIII. Promote the organization of workshops specifically devoted to high pressure (apart from the Spanish High Pressure School)
- IX. Organize international scientific events like the EHPRG and AIRAPT meetings
- X. Apply for European and other international calls for proposals (e.g. FP7) along with other research national and/or foreign groups, enterprises, etc.
- XI. Incorporation of MALTA into larger collaborative teams worldwide (not necessarily dedicated to high pressure)
- XII. Transfer knowledge to other scientific branches, technological companies, and industry
- XIII. Spread high pressure knowledge beyond the scientific community
- XIV. Design and maintenance of the MALTA website
- XV. Establish the fundamental bases for the creation of a future MALTA VIRTUAL RESEARCH CENTER

## TRAINING AND EDUCATIONAL GOALS

- XVI. To establish the appropriate forum for specialized Master-oriented training courses
- XVII. Formation of high pressure technical specialists for technological enterprises and industry
- XVIII. Continuing with the Spanish High Pressure School endeavour (running since 2002)
- XIX. Establishing a vigorous post-doc programme for our students
- XX. Promotion of junior researchers (tenure)

MALTA  
LINK

MALTA  
SCIENTIFIC  
LINK

MALTA  
TECHNOLOGY  
LINK

MALTA  
WEB  
LINK

MALTA  
FUTURE

MALTA  
SCHOOL

MALTA  
TENURE



2008

2009

2010

2011

2012

Cluster de Computación



Fase I



Fase II



Fase III

Taller de Mecanizado



Difractómetro de Rayos X



Espectrómetro Raman

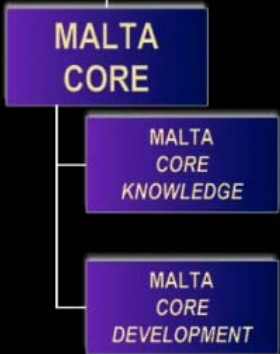


Sistema de Gran Volumen

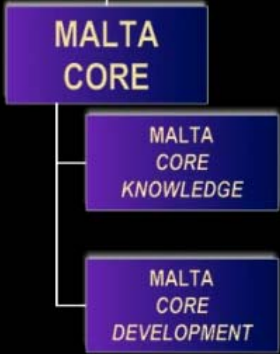


FTIR & Calentamiento Láser

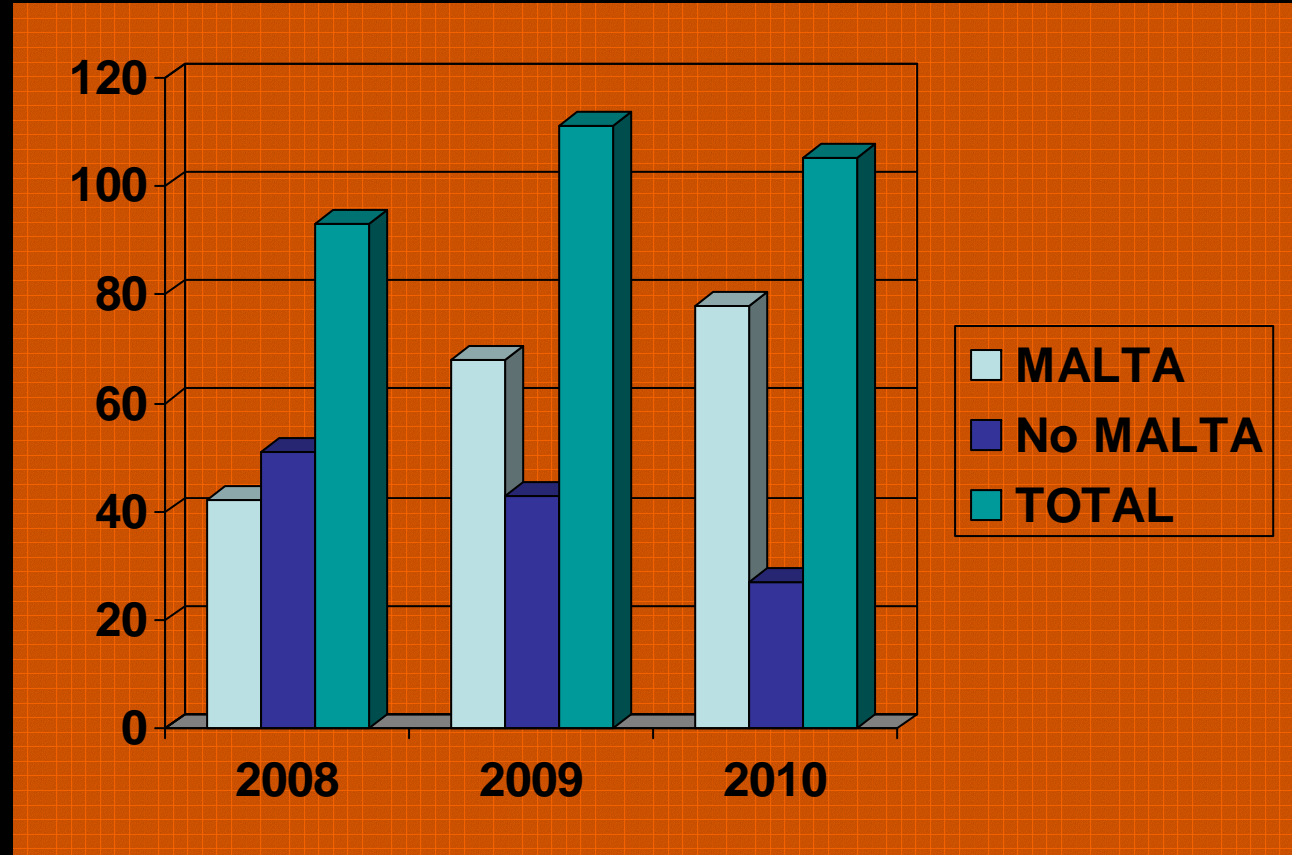




Resultados 2008-2010		
Indicador	Objetivo	Realizado
Publicaciones I.I. > 10	2-5	3
Publicaciones I.I. 3-10	(20-50)/año	85
Publicaciones I.I. < 3	(50-100)/año	101
Otras Publicaciones		121
Tesis Doctorales	10-20	14
Contratos Post-Doc (Nacional e Internacional)	10-20	6
Aumento índice <i>h</i> IPs	+2	Todos
Patentes (a partir 2º año)	2-5	3
Contratos Empresas	1-2/año	12
Proyectos FP7	2	2
Subvenciones ESF	1	-
Proyectos no-MEC/MICINN	(10-20)/año	30



## Evolución Publicaciones (I)

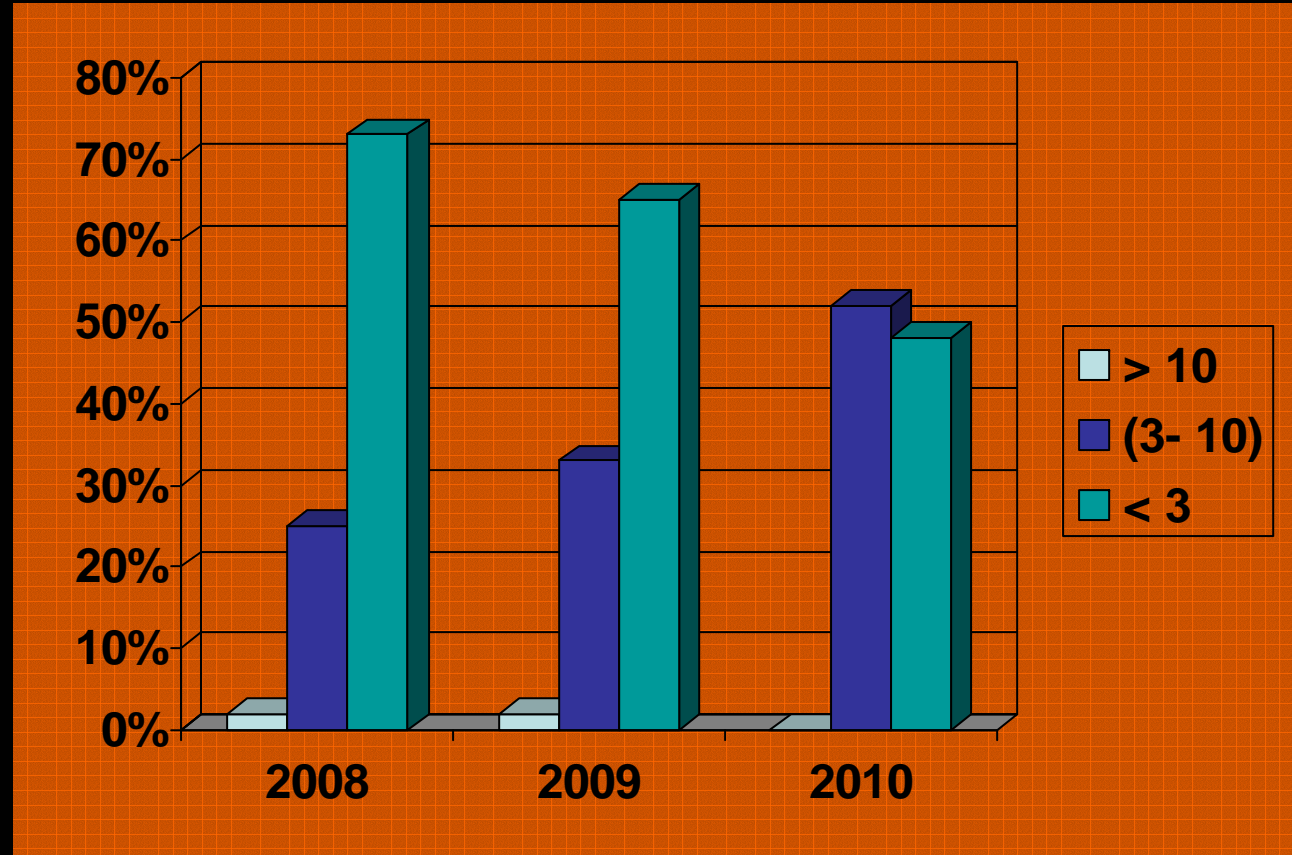


MALTA  
CORE

MALTA  
CORE  
KNOWLEDGE

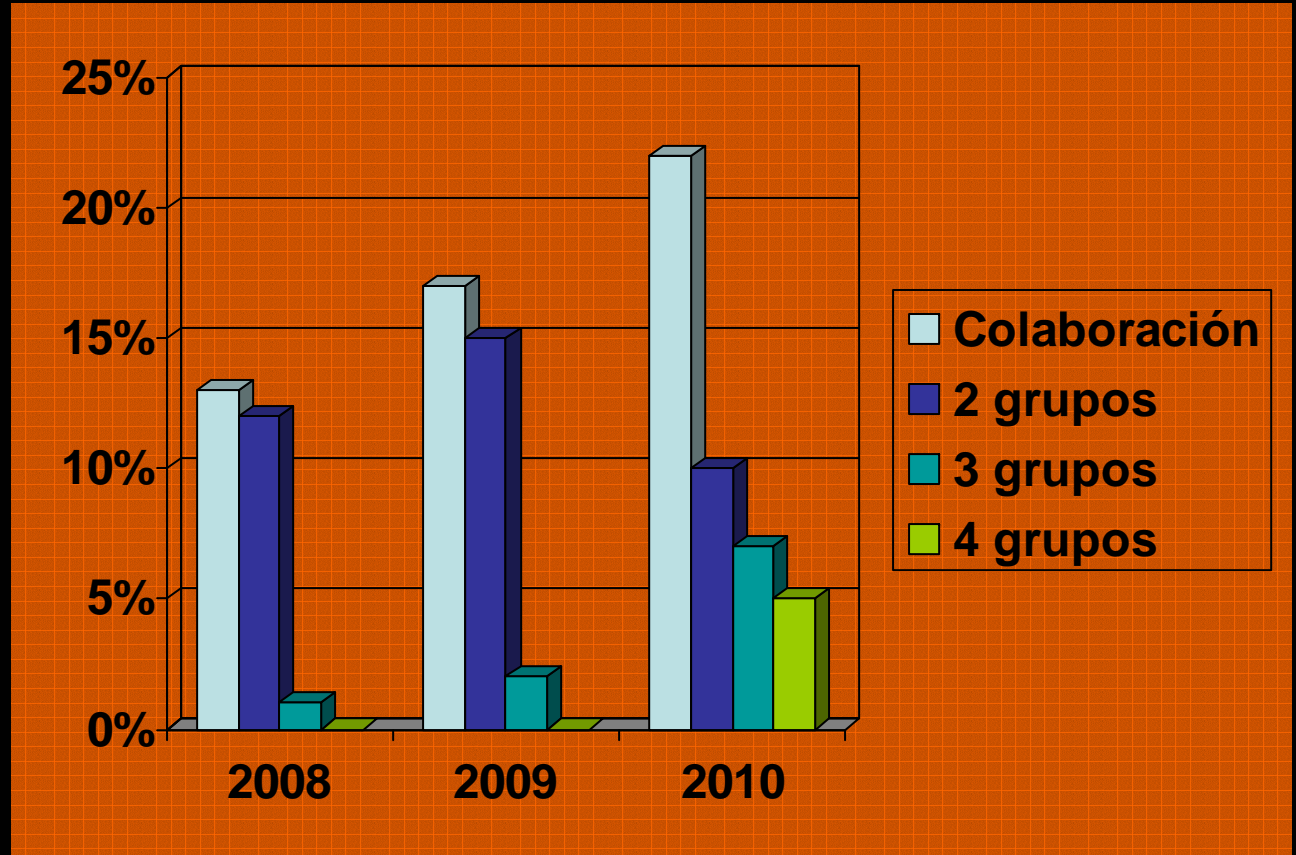
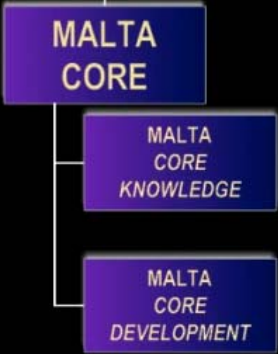
MALTA  
CORE  
DEVELOPMENT

## Evolución Publicaciones (II)





## Evolución Colaboración en Publicaciones



## MALTA CORE

MALTA CORE KNOWLEDGE

MALTA CORE DEVELOPMENT

## Resultados 2008-2010

	2008	2009	2010	Total
<b>PERSONAL</b>				
Nuevo personal incorporado con grado doctor	6	7	10	10
Contratos postdoctorales MALTA	2	6	6	6
Becarios-Contratos FPU	3	3	3	3
Becarios-Contratos FPI	5	8	9	9
Otros Contratos con financiación MALTA	3	4	9	9
Tesis doctorales	7	4	3	14
<b>PROMOCIÓN PERSONAL</b>				
Investigadores postdoc → Profesores Titulares	2	2	1	5
Investigadores senior → Catedráticos	1	2	2	5
Estabilización CSIC			1	1
<b>TECNOLÓGICOS</b>				
CELDAS DE YUNQUE - MALTA		5	5	10
SPIN-OFF "YPSICON" – UAB (comercialización patente de esterilización HP)			1	1
SENSORES (HP, Temp, pH), VÁLVULAS UHPH			1	1

**MALTA  
CORE**

MALTA  
CORE  
KNOWLEDGE

MALTA  
CORE  
DEVELOPMENT

## Resultados 2008-2010

	2008	2009	2010	Total
<b>FINANCIACIÓN EXTERNA (NO MICINN)</b>				
TOTALES (Miles de Euros)	261	261	1.062	<b>1.584</b>

	2008	2009	2010	FP7
MALTA			105.000	
UCM	44.909	12.490	847.550 (*)	
ULL2	10.800	9.340	5.730	
UJI		82.500		
UAB	6.000			1.300.000
UCAN	56.200	56.200	36.000	
UV	28.000			
ULL1	102.880		67.854	
UOVI		38.842		
UPV	12.000	11.500		
IF-CSIC			(*)	
CAB-INTA		50.000	(*)	7.955.415

MALTA LINK

MALTA SCIENTIFIC LINK

MALTA TECHNOLOGY LINK

MALTA WEB LINK



Materials Science and Powder Diffraction Beamline will be devoted to i) **high resolution powder diffraction**, ii) **high pressure powder diffraction** using diamond anvil cells and on a limited scale iii) **single crystal diffraction at high pressures**

Extreme Conditions Diffractometer for the ILL: **XtremeD**



"Association Internationale pour l'Avancement de la Recherche et de la Technologie aux Hautes Pressions"

**AIRAPT**

"International Association for the Advancement of High Pressure Science and Technology"



*The European High Pressure Research Group*

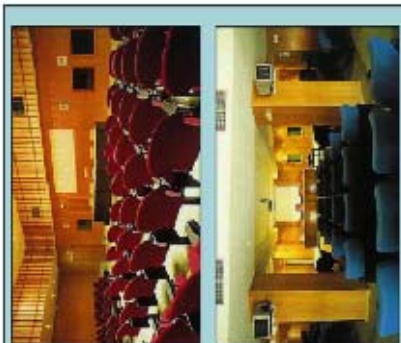
[http://www.malta-consolider.com/JointAIRAPT\\_EHPRG2015\\_Madrid.html](http://www.malta-consolider.com/JointAIRAPT_EHPRG2015_Madrid.html)

## MALTA LINK

MALTA  
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LINK

MALTA  
TECHNOLOGY  
LINK

MALTA  
WEB  
LINK




Complutense University of Madrid  
Madrid  
SPAIN

Additional Rooms  
For  
Parallel Sessions  
(150-200 people)



Halls for  
Poster Sessions  
and  
Exhibitors



Complutense University of Madrid  
Madrid  
SPAIN

Estimated dates: 20-24 July, 2015

Registration: 750 euro (including lunch & city transportation pass)

Links:

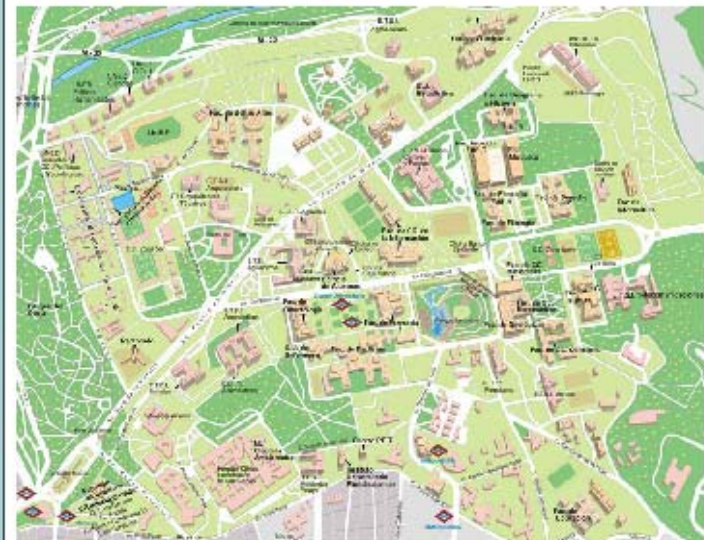
[www.ucm.es](http://www.ucm.es) (host institution)

[www.madrid.es](http://www.madrid.es) (city)

[www.esmadrid.com/en/portal.do](http://www.esmadrid.com/en/portal.do) (traveling, hotels, culture, ...)

[www.malta-consolider.com](http://www.malta-consolider.com) (updates & general info)

Contact: [vgbaonza@quim.ucm.es](mailto:vgbaonza@quim.ucm.es)





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Simposio  
**MALTA-Consolider**  
23-27 Enero 2011, Miraflores de la Sierra



 **Consolider** Programa  
Ingenio  
2010

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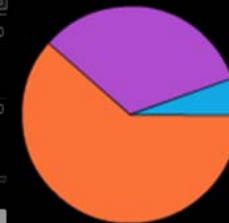
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Uso del sitio

2.286 Visitas

77,87% Porcentaje de rebote



Tráfico directo  
1.404,00 (61,42%)

Motores de búsqueda  
758,00 (33,16%)

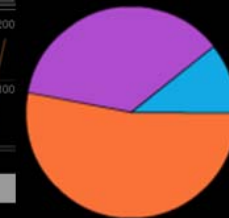
Sitios web de referencia  
124,00 (5,42%)



Uso del sitio

3.368 Visitas

77,49% Porcentaje de rebote



Motores de búsqueda  
1.785,00 (53,00%)

Tráfico directo  
1.223,00 (36,31%)

Sitios web de referencia  
360,00 (10,69%)

FUENTE:

<http://www.google.com/analytics/>

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MALTA WEB LINK

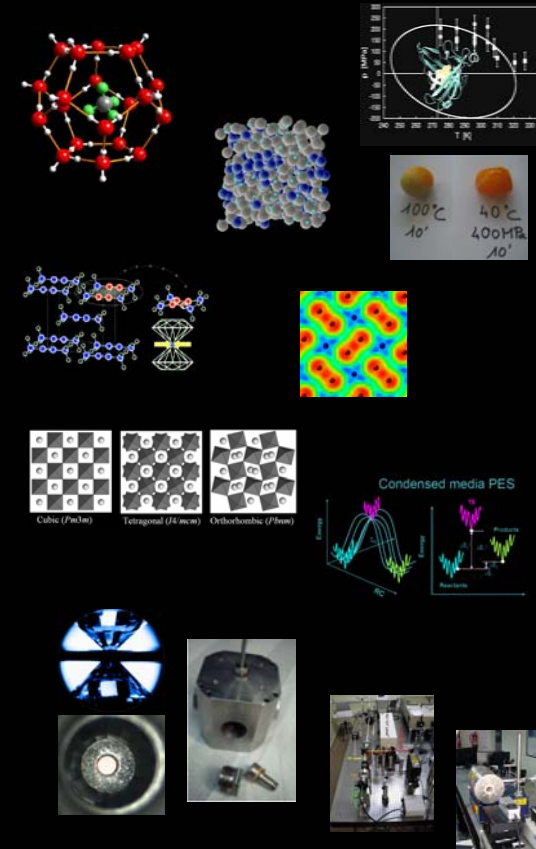
## EDICIÓN MANUAL ESCUELA DE ALTAS PRESIONES

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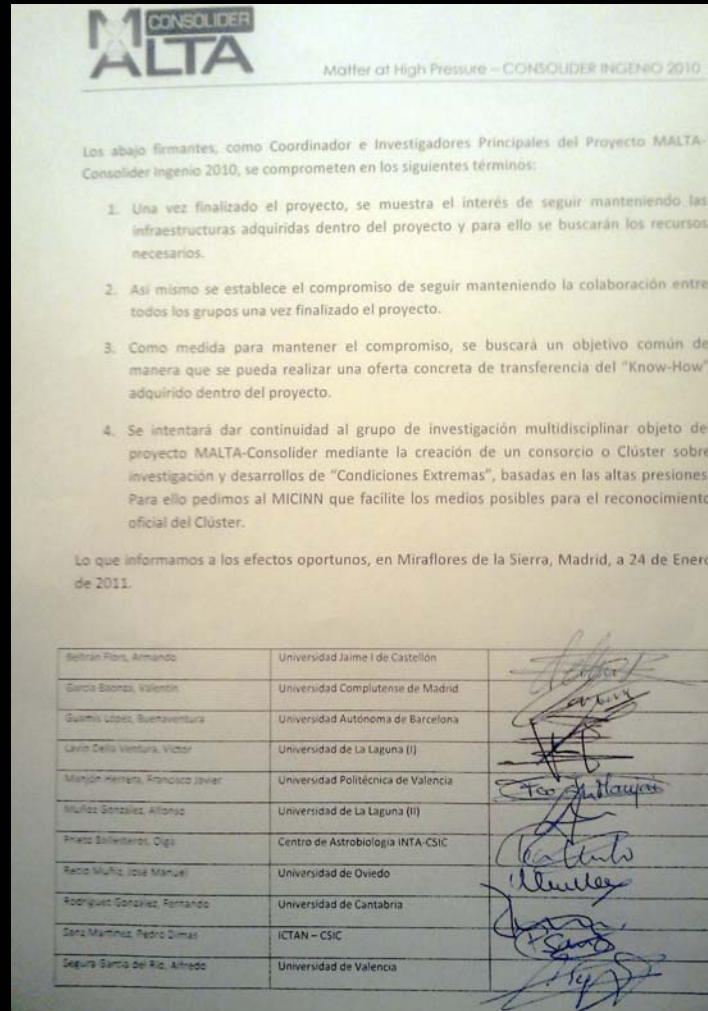
MALTA INITIATIVE – CONSOLIDER – INGENIO 2010						
SCIENTIFIC SCHEDULE - MALTA CORE						
		1st YEAR	2nd YEAR	3rd YEAR	4th YEAR	5th YEAR
<b>Computational Effort</b>		Server Inst. & Setup	Server Update I	Server Update II	Server Update III	Server Update IV
I	I.a.	Clathrate Synthesis	PTx, Full Characterization	Scientific outcome and Applications		
	I.b.	Physico-chemical studies of aqueous solutions		Supramolecular and protein systems: experiments and computer simulation	Scientific outcome and Applications	
	I.c.	Preliminary microbiological studies		Scientific and applied (food science) outcome		
II	II.a.	NOCH: Phase diagrams and physical transformations		Scientific outcome and Applications		
	II.b.	NOCH: high pressure reactivity			Scientific outcome and Applications	
III	III.a.	Oxides: synthesis and characterization		Scientific outcome and Applications		
	III.b.	Minerals: physico-chemical characterization	Minerals: catalytic activity		Scientific outcome and Applications	
TECHNOLOGICAL SCHEDULE - MALTA TRANSFER						
IV	Cell design and construction		Inst. and testing in MALTA labs.		Installation in external labs, enterprises, industry	
V	Laser heating setup			Full operation for MALTA team		
VI	Fluor. Probe development	Check & comparison existing probes		Full operation for MALTA team		
VII	Probe design and construction		Probe implementation		Full operation	
COOPERATION AND OUTREACH SCHEDULE - MALTA LINK						
EXTERNAL LINKS	EHPRG Groups and satellites			AIRAPT Groups and satellites, and other international cooperation efforts		
	MALTA WEB					
TRAINING AND EDUCATIONAL SCHEDULE - MALTA FUTURE						
EVENTS	SHPS	HP Training	SHPS	HP Master	SHPS	

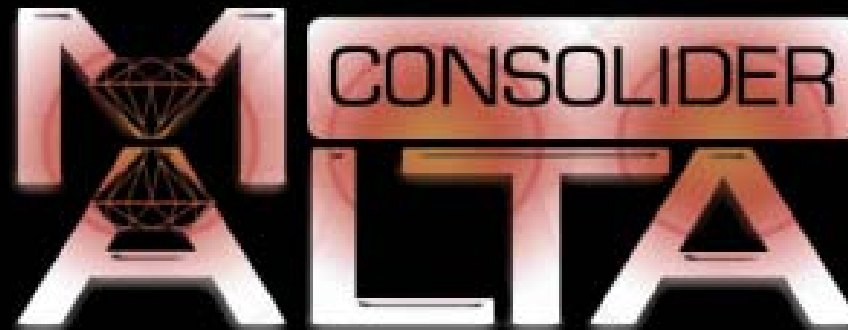


Informational cards for:
 

- Synchrotron Light Facility**: The Materials Science and Photon Diffraction beamlines will be operated at a high-resolution powder diffraction, a high-pressure powder diffraction using diamond anvil cells and a limited scan to single crystal diffraction at high pressures.
- XtremeD**: An Extreme Conditions Diffractometer for the ILL.
- The European High Pressure Research Group**
- AIRAPT**

- Creación de Clúster de Alta Presión
- Compromiso de Continuidad





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CSD2007-00045**



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