

Plan de Actuación 2010-2013

Plan Estratégico 2010-2013 Instituto de Estructura de la Materia, CSIC



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■ DESCRIPTION:

“The ‘Instituto de Estructura de la Materia’ (IEM) was established in 1976 by Prof. Eduardo Primo Yúfera, who was at that time the President of CSIC. The first Director of the Institute was Prof. Alfredo Tiemblo. Initially, the Institute was formed by several researchers working on the fields of Particle Physics, Molecular Physics, Quantum Chemistry, and Crystalline Polymers, with only five scientists belonging to the staff of the Institute. Nowadays, a broad spectrum of research lines are covered by more than 40 staff scientists.”

“The mission of the Institute is to contribute to the advance in the knowledge of the structure of matter at an **ample range of physical scales, from the building blocks of matter and space time, to nuclei, atoms, molecules, and macromolecules, including condensed matter and mesoscopic systems.**”



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- **RESEARCH LINES:**

- General Research Line
- Nuclear Physics (Staff: 20)
- Experimental Molecular Physics (Staff: 22)
- Physics of Nanostructures and Biosystems (Staff: 17)
- Statistical Physics (Staff: 11)
- Macromolecular Physics (Staff: 20)
- Gravitation and Cosmology (Staff: 10)
- Formation and Evolution of Galaxies (Staff: 10)

- **SERVICES:**

- Financial and Administrative Management Office (Staff: 6)



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- **RESEARCH SUBLINES:**

- **Nuclear Physics:**

- General Research Subline
- Theoretical Nuclear Physics
- Experimental Nuclear Physics

- **Experimental Molecular Physics:**

- General Research Subline
- Molecular Fluid Dynamics
- Molecular Physics of Atmospheric and Astrophysical Systems
- Laboratory Laser Spectroscopy for Remote Sensing



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- **RESEARCH SUBLINES:**

- **Physics of Nanostructures and Biosystems**

- General Research Subline
- Chemical Physics of Photodeposition and Ablation Processes
- Biospectroscopy
- Optical Spectroscopies on Plasmon Metal Nanostructures

- **Statistical Physics**

- General Research Subline
- Systems Devoid of Long-Range Order
- Strongly Correlated and Mesoscopic Systems



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- **RESEARCH SUBLINES:**

- **Macromolecular Physics**

- General Research Subline
- Nanostructure and Mechanical Properties of Polymer Systems
- Dynamics and Structure of Soft Condensed Matter
- Modeling and Properties of Synthetic and Biologic Macromolecular Systems

- **Gravitation and Cosmology**

- General Research Subline



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▪ **SWOT:**

▪ **Strengths:**

- Interdisciplinarity
- Sinergy between experimental and theoretical groups
- Groups with proven scientific excellence and international projection at an ample range of physical scales.
- First class laboratories, some of them unique. Pioneering techniques
- High visibility within CSIC
- Contributions to transfer of technology.
- Seminal vocation of the Institute. Groups and research lines born at IEM have scaled up and eventually given rise to groups of excellence which have participated in the creation or consolidation of other CSIC Institutes.
- Broad experience in large facilities at user, instrumentation and executive level.



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- **SWOT:**

- **Weaknesses:**

- Difficulties to recruit undergraduate students
- Low percentage of postdocs
- Dependence on external Master and PhD (University) degrees for training
- Strong dependence of the laboratories on the workshop facilities of the Center of Physics Miguel A. Catalán, which have been drastically reduced in recent years
- Lack of specialized technicians throughout most IEM laboratories
- Lack of administrative personnel, who are by all means overburdened, thus hindering any initiative involving bureaucratic work
- Relatively few EU research grants
- Scattering of laboratories and offices throughout four buildings



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▪ **SWOT:**

▪ **Opportunities:**

- Launch of new experimental projects (Alba, FAIR, Second Target at ISIS, HERSCHEL, ALMA)
- Consolider-Ingenio programs, where some lines are involved
- Collaboration with the Universities through "Unidades Asociadas"
- Organization of international meetings to enhance the visibility and internationalization
- Great possibilities for outreach, with topics of interest for the general public
- Range of possibilities for financial support and for participating in thematic, multidisciplinary networks
- Activities included in the thematic priorities stated by CSIC in its "Strategic Axes". Specifically: "Advanced Instrumentation and Engineering", "Hydric Resources" and "Aging and Quality of Life"
- New status of CSIC, which should provide larger flexibility



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- **SWOT:**

- **Threats:**

- Increase of bureaucratic burden without a parallel increase of administrative personnel
- Decreasing number of students in scientific careers
- Bad economical perspectives worldwide which may affect the governmental support to the investments in R&D&i
- Research lines in the boundary between different specialization fields, which leads to insufficient representation in boards of decision
- The system of assignation of JAE pre and post-doc contracts is not especially favorable for competitive institutes like IEM
- Complexity of administrative processes for the acquisition of sophisticated equipment



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- **SWOT:**

- **Threats:**

- Difficulties and complexity of the administrative process for hiring new personnel, especially in the case of non EU citizens
- Deterioration of CFMAC workshops
- Lost of human resources owing to reallocations of research lines in CSIC. A line of research in Astrophysics, active until now at the Institute, is in a process of reallocation in the framework of this Plan of Action. During the last Strategic Plan of the Institute, 4 new tenured scientists joined that line of research at IEM. This investment, while reinforcing excellence in CSIC-Astrophysics, will not produce direct compensations at IEM

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■ **COMPETING CENTERS:**

- Dep. of Chemistry, Nuclear Decay Spectroscopy Group, Michigan State University
- Departamento de Física Teórica de la Materia Condensada, Universidad Autónoma de Madrid
- Perimeter Institute for Theoretical Physics, Waterloo
- Department of Physics, Ohio State University
- Polymer Science and Engineering, University of Massachusetts at Amherst
- Chemistry Department , Northwestern University



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■ COLLABORATING CENTERS:

- Centre de Recherche sur la Matière Divisée, CNRS
- Institute for Gravitation and the Cosmos, Penn State University
- Center for Nanophotonics, Philips Research Labs & FOM-Institute for Atomic and Molecular Physics
- Nuclear Physics Group, Dep. of Physics and Astronomy, Aarhus Universitet
- Institute de Physique de Rennes, Université de Rennes I
- Department of Chemistry, State University of New York at Stony Brook



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▪ **LEADING CENTERS:**

- Instituto de Ciencias Nucleares, Universidad Nacional Autónoma de México (UNAM)
- Laboratoire Inter-Universitaire des Systèmes Atmosphériques (LISA), CNRS, Faculté des Sciences, Université Paris XII
- Laboratoire de Physique Theorique de Toulouse, IRSAMC Université Paul Sabatier
- Donostia International Physics Center, Universidad del País Vasco
- Nuclear Physics Group, Dep. of Physics and Astronomy, Aarhus Universitet
- Materials and Surface Science Group, Department of Chemistry & Biochemistry, University of Windsor



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▪ **SELECTIVE ADVANTAGES:**

- The Institute houses highly interdisciplinary research with a broad variety of lines within the field of "Physics of the Structure of Matter"
- There exists a combined presence of experimental and theoretical groups which, while predominantly involved in basic research, have contributions to transfer of technology
- The composition of the Institute reveals the presence of several groups pioneers in their research lines in Spain, with first class laboratories, some of them unique
- IEM groups have a broad experience, at all levels, in international large facilities in a diversity of techniques (Neutron Scattering, Synchrotron Radiation and Ion Accelerator)
- The Institute has great capacity and potential for outreach, as shown by the participation of IEM in the "Science Week" and CSIC outreach programs



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■ OBJECTIVES:

■ General Goals:

- Strengthen IEM as an international scientific reference center for the different disciplines in which it is involved
- Consolidate the current research groups, developing their research abilities and accomplishing scientific leaderships
- Enforce the capability of the Institute in the training of scientific staff, from undergraduate students to postdoctoral associates
- Achieve stable positions for those postdoc researchers with proven scientific excellence
- Improve and update the existing scientific equipment



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■ OBJECTIVES:

■ General Goals:

- Establish cooperative interests with industrial partners
- Enhance the visibility of IEM by intensifying the relations with other research groups and enterprises of international prestige
- Promote the participation of the Institute in the different programs devoted to the dissemination of the scientific activity
- Optimize the administrative procedures and increase the number of administration employees



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■ OBJECTIVES:

■ Specific Goals:

- **Scientific:** Progress in the research of the Structure of Matter at very different scales. The specific scientific goals for each of the research lines are detailed in their corresponding strategic plans
- **Knowledge Transfer:** Support every initiative aimed at increasing the R&D&i component of the research. Maintain the contracts currently active with private firms and prospect new collaborations with the industry, based on the increasing implication of the Institute on instrumentation related to large facilities.
- **Training:** This is essential for the research activity of the Institute:
 - a) Upgrade the "Curso de Introducción a la Investigación"
 - b) Encourage the participation in University Master and Doctorate programs, Summer Schools, etc.
 - c) Promote the creation of Master programs with "CSIC" label
 - d) Organize a yearly series of inter-dept. seminars for PhD students.



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■ OBJECTIVES:

■ Specific Goals:

- **Outreach:** Maintain the level of commitment to the organization of the Science Week. Participate in other outreach initiatives with institutional involvement of CSIC. Improve the Institute web page as a tool for the visibility and publicity of the outreach activities. Transmit to the Center of Physics the opportunity to create a new service for outreach and communication with the media
- **Internationalization:** Consolidate and strengthen the numerous present international collaborations of the different research lines. Support with special emphasis the participation at International Large Facilities. Publicize abroad the position calls at all levels. Estimulate the participation in European research grants. Promote the organization of international congresses
- **Gender equality:** Smoothly tend towards an even gender distribution, in agreement to the Spanish "Ley de Igualdad", without compromising scientific excellence



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■ STRATEGY:

- **Strengthen the research lines** developed at the Institute

Owing to the seminal character of IEM, it would be nowadays difficult to understand the configuration of the Physics Area in CSIC without the Institute. The wide scope of the research lines developed at IEM, some of them included in the priorities stated in the Strategic Axes, offer a great opportunity to definitively place the Institute as a reference international center.

During the last years, IEM has lost part of its resources. Part of the Dept. of Theoretical Physics and Chemistry moved to IFT in 2004. The group of Molecular Astrophysics, presently in DAMIR, is moving to the Center of Astrobiology, while the group of Formation and Evolution of Galaxies, although still belonging to the Institute, is in the process of considering a more adequate scientific allocation in CSIC. Therefore, a large part of the resources invested in the Institute will not in fact result in a practical improvement for it, but instead for CSIC as a whole. We believe IEM should correspondingly be rewarded by CSIC when designing its future scientific policy.



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■ STRATEGY:

• Recruitment of Students:

- Connection with the university, in particular through "Unidades Asociadas" and participation in Doctorate and Master Programs
- Continuation and upgrading of the "Curso de Iniciación a la Investigación", addressed to university students in the last years of their undergraduate courses
- Broad advertising of the different calls for PhD students in which IEM is involved
- Commitment to participate in the recently created Erasmus Placement program



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■ STRATEGY:

- Optimization of the **administrative** procedures, improving the administrative tools and creating an IEM intranet. Increase of the management staff. The Institute will put special emphasis on this
- Improvement and update of **laboratories**. Request that the Strategic Plan of the Center of Physics includes the demand of a stronger support to the workshop facilities
- Reinforce the presence of IEM in the **Strategic Axes** "Advanced Instrumentation and Engineering", "Hydric Resources" and "Aging and Quality of Life"
- **Social measures**: Schedule all official meetings of the Institute before 3 pm in order to fulfill the work-family conciliation law
- Optimization of the available **space**. A correct distribution of the space is essential for a more efficient operation. If a new location is proposed by CSIC to the institutes currently in the Main Campus, our intention is to create a board with the aim at studying the real possibilities for moving the Institute and analyzing pros and cons



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■ STRATEGY:

• Outreach strategy:

Use the already proven potential for outreach.

Continue with a tradition of active implication in the organization of the Science Week, with at least 4 conferences per year.

In collaboration with the Optics Institute and within the framework provided by the Centre of Physics, IEM will also organize Doors Open Days for the Science Week on a biannual basis.

In addition, the Institute will participate in other outreach activities with institutional implication of CSIC, namely, the ESTALMAT, Science in the City, and IberCivis programs.

The use of the institutional archive Digital.CSIC will be promoted to allow free access to outreach material.

IEM will encourage the Center of Physics to include in its Strategic Plan the creation of a new service for outreach and communication



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■ STRATEGY:

• Internationalization:

The international projection of the research groups at IEM, as well as their relationships with several International Large Facilities, will be leveraged and promoted.

Special effort will be put to reinforce the administrative personnel, as a necessary step to help in reducing the bureaucratic burden associated to European research grants

Collaborate actively with the Vice-Presidency of International Relations in the organization of informative events aimed at facilitating the applications for European grants

Support the organization of international scientific meetings to promote the visibility of the Institute

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■ STRATEGY:

• Gender:

A natural compensation of the unbalanced distribution in gender at the higher, tenured levels is expected in a reasonable period of time; this trend is confirmed by the new permanent positions at IEM within the 5-year term of the last Strategic Plan.

Following the policy of the Institution, IEM will promote even gender representation in official committees, juries, etc.

• Knowledge Transfer:

Use the existing technology transfer component present in the Institute as a guidance to prospect similar approaches with other companies.

Based on the increasing implication of the Institute on instrumentation related to large facilities, new collaboration with the industry will be explored.

Initiatives to apply for support from CSIC through the JAE-transfer program will be encouraged.



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■ Progress Indicators:

	Indicator	Former Average	2010	2011	2012	2013
Article / Book chapters	HIGH Percentil 75	87	73	81	94	103
	MEDIUM Percentil 50-75	30	43	47	48	47
	LOW Percentil <50	28	36	35	31	32
	TOTAL	145	152	163	173	182
Congress	HIGH Percentil 75	-	46	48	55	58
	MEDIUM Percentil 50-75	-	35	33	35	35
	LOW Percentil <50	-	29	31	29	28
	TOTAL	107	110	112	119	121
Fundings (k€)	Research projects	<i>1139</i>	1893	703	912	1860
	I+D Contract	59	30	30	30	40

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■ Progress Indicators:

	Indicator	Former Average	2010	2011	2012	2013
Knowledge Transfer	Requested priority patents	0.5	1	2	0	1
Training	Theses	5	7	7	8	10
	Courses & Masters (hours)	286	290	300	305	310
Outreach	Events	8	8	9	10	12
	Material	0.5	6	7	8	8
Internacionalization	Foreign staff	8	9	9	10	10
	Colaborations	13	15	16	18	18
	Co-authoring scientific articles	83	90	92	100	106
Services	Relative efficiency respect to 2009	-	1.1	1.1	1.2	1.2

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■ HUMAN RESOURCES:

Application (approximately) based on:

- Annual increase of 5% in permanent scientific staff
- Annual increase of 15% in technical and management staff
- Non-permanent researchers (phD students, postdocs):
45% of CSIC coverage
- Compensation of retirements during the period 2010-2013 (7-9)
- 50% of the (permanent and non-permanent) staff positions compromised by the reallocation of DAMIR groups

➡ TOTAL: 61 positions



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- **Human resources:**

CT_____12

TS_____2

TM_____4

Ay_____4

Jae-S_____7

Jae-D_____12

Jae-Pre_____13

Jae-Tec_____7

- **Fundings (EQUIPA):** 2M€

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■ Strategy on Research Lines and Services:

Global actions: Boost/Consolidate all Lines and Services. Priority: 1
 Keep General Line. Priority: 2

Staff: General Line ➡ Priority: 1
 Research Lines ➡ Priority: 2
 Management ➡ Priority: 1

	General Line	Nuclear	Molecular	Nano-structures	Statistics	Macro-molecular	Grav& Cosmo.	Management
CT	12	0	0	0	0	0	0	0
TS	1	0	0	0	0	0	1	0
TM	0	1	1	0	0	0	0	2
Ay	1	0	0	1	0	1	0	1
JAE-S	6	0	0	0	0	0	1	0
JAE-Doc	9	1	0	1	1	0	0	0
JAE-Pre	8	0	2	0	2	1	0	0
JAE-Tec	4	1	0	1	0	1	0	0

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■ Strategy on Research Lines and Services:

Staff: General Line ➡ Priority: 1

This pool of human resources is assigned to the General Line with the aim that the Institute distributes them among the rest of research lines during the period 2010-2013, taking into account annually the needs of the different lines and the scientific and/or technical merits of the potential candidates. The Institute understands that this policy is the best way to promote scientific excellence, favoring quality and production in the research activity through competition.

Research Lines ➡ Priority: 2

This assignation reflects the advisability of reinforcing the line as expressed in the "Critical Analysis of the Research Lines". The level of priority (2) means that these positions should be covered by the end of the Strategic Plan provided that the increase of human resources requested by the Institute is accomplished.

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▪ Strategy on Research Lines and Services:

Staff: Management ➡ Priority: 1

The Financial and Administrative Management Office plays a fundamental role for the correct running of the Institute. The present overburdening of the Service, together with the high average age of the personnel and repeated problems with sick leaves recommend a decided action to reinforce the staff of the Office, with maximum priority.

Equipment:

Nuclear, Molecular, Macromolecular and Nanostructures & Biosystems

Priority ➡ A maximum priority is given to 60% of the amount, while the priority for the remaining 40% will be decided by the Institute on a yearly basis during the implementation of the Strategic Plan. That decision will take into account the financial aid assigned in the EQUIPA action, the opportunity and relevance of the equipment required by the different research lines, and the added value that this equipment may have for the Institute and for CSIC.

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■ **Calendario:**

30 octubre.

Elaboración de Planes Estratégicos por los centros e institutos.

Noviembre-Diciembre
Evaluación externa remota.

Enero de 2009.
Evaluación presencial (entrevistas con directores).

Febrero de 2009.
Re-elaboración definitiva de Planes Estratégicos.

20 de marzo de 2009: Finaliza el proceso.