El Instituto de Fusión Nuclear *"Guillermo Velarde"*

Universidad Politécnica de Madrid

From 1981 to today

History

Founder Team: Profs. G. Velarde (Director), C. Ahnert, J.M. Aragones, N.Carpintero, J. Martínez-Val, E. Minguez, J. M. Perlado, M. Piera, J. Sanz

Star operation 1981

OFFICIAL in 1982

- Objectives:
  - Having an Advisory Group for Presidency of Government in **High Energy Density Physics in Nuclear Applications**
  - **Inertial Confinement Fusion (ICF)**
  - Have a Group to research in ***Nuclear Physics and its applications mainly energy and radiation sources.***
- Establish collaborations with Lawrence Livermore National Laboratory, CEA France, Institute Lebedev of the Russian Academy of Science, Institute Laser Engineering (Japan), KfK Germany,

Manifesto of Madrid

Inertial Confinement Fusion: The Next Step

Recent research results in Inertial Confinement Fusion (ICF) have put to rest fundamental questions about the basic feasibility of achieving high gain ICF, and make it clear that there should be an aggressive program to design, build, and operate ICF facilities to demonstrate high gain fusion in the laboratory. Achieving this goal will make possible the use of ICF technology for a variety of applications as well as providing a capability to explore the frontiers of science in directions of extreme conditions in temperature and density not previously accessible.

ICF applications include fission/fusion hybrid reactors, special isotope production, an environmentally attractive pure fusion source for electric power production, and advanced space propulsion. As a technology for a future fusion energy option, ICF has significant technological advances over the magnetic confinement approach and has become a highly credible alternative.

The attainment and utilization of high gain ICF requires a concerted effort to provide the required laboratory facilities. The benefits to be derived from achieving high-gain ICF in the laboratory are so important that the physics, technology and economic issues should now be addressed. The time has arrived to begin to seriously seek a new age in the development of ICF. The laudable goal of the international ICF community is to utilize the fullest possible collaboration among nations in order to provide the technological benefits from fusion that will serve all humanity.

In the spirit of the 19th European Conference on Laser Interaction with Matter (ECLIM) held in Madrid, we urge the international community to take action now.

(U.S.A)
(Spain)
(Fed. Rep. Germany)
(U.S.A.)
(FRANCE)
(ITALIA)
(USSR)
(UK)

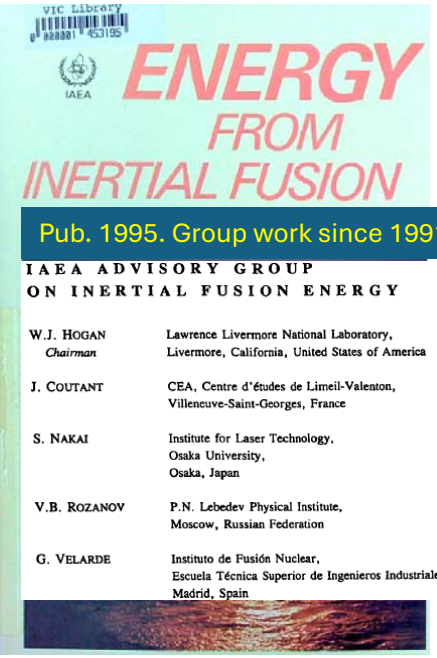
AND ABOUT 130 SCIENTISTS MORE.

The First International document signed by all Inertial Confinement Fusion Laboratories in the World asking for declassification of key information to DoE (USA) needed for the development of the Energy from Inertial Fusion 1988

Participants at the ECLIM 1988 Signing of Madrid Manifesto

RESEARCH AREAS

- ENERGY
  - NUCLEAR
    - FUSION
      - INERTIAL BY LASERS TARGET PHYSICS
        - Radiation Hydro code development and simulation
        - Atomic Physics codes for HEDP data
        - NUCLEAR DATA and Neutron Transport and Activation codes development.
      - MATERIALS & REACTOR Systems)
        - Nanomaterials (Foams, Needles, Columnar) & High Entropy Alloys
        - Optical Materials (Nanoplasmonic)
        - Systems (First Wall & Blanket)
        - MAGNETIC (MATERIALS and SYSTEMS)
    - FISSION
      - REACTORS & WASTE TRANSMUTATION
    - HYGROGEN Generation
- XUV & X-RAYS INTENSE RADIATION SOURCES for Astrophysics and Atmospheric Research
  - NEUTRONS
  - IONS



Pub. 1995. Group work since 1991

IFN-GV

IAEA
International Atomic Energy Agency

4th IAEA-TM on Physics and Technology of IFE Targets and Chambers
September 13, 2007

Form A (pdf, word)
Form B (pdf, word)
Form C (pdf, word)
Abstract template (word)

IAEA-TECDOC-1466

Physics and technology of inertial fusion energy targets, chambers and drivers

Proceedings of a technical meeting held in Daejon, Republic of Korea, 11–13 October 2004

IAEA-TECDOC-1460

Elements of power plant design for inertial fusion energy

Final report of a coordinated research project 2000–2004

The Institute of Laser Engineering (ILE), Osaka University, is going to host the 4th IAEA Technical Meeting (IAEA-TM) on Physics and Technology of Inertial Fusion Energy Targets and Chambers at the International Conference Center Kobe, Kobe, Japan, on Sep. 13, 2007 in a style embedded in IFSA 2007. The previous meetings were held in Madrid, Spain (June, 2000), San Diego, USA (June, 2002), and Daejon, Korea (Oct., 2004).

IAEA
International Atomic Energy Agency (/)

Pathways to Energy from Inertial Fusion - An Integrated Approach

Closed for proposals

Project Type	Project Code	CRP	Approved Date	Status
Coordinated Research Project	F13011	1372	7 March 2006	Closed

Start Date	Expected End Date	Completed Date
15 June 2006	12 July 2010	12 July 2010

IAEA
International Atomic Energy Agency (/)

Pathways to Energy from Inertial Fusion: Materials Beyond Ignition

Closed for proposals

Project Type	Project Code	CRP	Approved Date	Status
Coordinated Research Project	F13016	2035	8 July 2015	Closed

Start Date	Expected End Date	Completed Date
13 November 2015	31 March 2019	8 April 2019

Participating Countries
Chile Estonia France India Japan Poland Republic of Korea
Russian Federation Serbia Singapore Spain Ukraine Uzbekistan

The fifth International Conference on Inertial Fusion Sciences and Applications (IFSA2007) IOP Publishing
Journal of Physics: Conference Series **112** (2008) 032051 doi:10.1088/1742-6596/112/3/032051

The International Atomic Energy Agency's Programme on Inertial Fusion Energy

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Abstract. The International Atomic Energy Agency has been promoting international activity and collaboration related to the use of inertial fusion confinement schemes for energy production for many years. Thorough review of inertial fusion research and a detailed analysis of future prospects has been conducted. Inertial Fusion Energy is now approaching the turning point in the long history from physics oriented research to fusion energy oriented development. The programme of the International Atomic Energy Agency reflects, to some extent, this development.

IAEA TECDOC SERIES

2020

IAEA-TECDOC-1911

Pathways to Energy from Inertial Fusion: Structural Materials for Inertial Fusion Facilities

Final Report of a Coordinated Research Project

2nd Research Coordination Meeting on Pathways to Energy from Inertial Fusion – Materials Research and Technology Development (F13020)
Monday, 13 June 2022 - Wednesday, 15 June 2022