POLITÉCNICA

Instituto de Fusión Nuclear

INSTITUTE OF NUCLEAR FUSION (DENIM)

Contact Data

Universidad Politécnica de Madrid
ETS de Ingenieros Industriales
José Gutiérrez Abascal, 2. E-28006 Madrid-SPAIN

Telephone numbers: +34 91 336 3108/09/10
Fax number: +34 91 336 3002
nuria@denim.upm.es
elena@denim.upm.es

www.denim.upm.es

Universities with sections assigned to DENIM

UNED
ULPGC

Organizations collaborating with DENIM

UCIII
CIEMAT
UPC
Universidad de Alicante
$F^2 I^2$
Lawrence Livermore National Laboratory (USA)
Rutherford Appleton Lab. (UK)
CEA, LULI, Ecole Polytechnique (France)
Institute Laser Engineering, Osaka Univ. (Japan)
ITER Cadarache (France)
University of Reno, Berkeley, Wisconsin …… (USA)
FZK Karlsruhe (Germany)
University of Thrace (Greece)
Lebedev Physical Institute (Russia)

POLITÉCNICA

UNIVERSIDAD POLITÉCNICA DE MADRID

R&D&i Institutes

INSTITUTE OF NUCLEAR FUSION (DENIM)

The Institute of Nuclear Fusion (DENIM) is a Research Institute of the Universidad Politécnica de Madrid (UPM), with assigned sections from UNED and ULPGC. It was created to carry out the highest standards of excellence in research in the field of nuclear fusion.

DENIM officially works since 1981 and since then it maintains the leadership in the most advanced research about nuclear fusion and fission. DENIM activities centres around inertial confinement fusion, both matter physics at a very high energy density dimension and physics associated to technology for large-scale energy generation. Transmutation of radioactive waste and the design of advanced fission reactors are also under research. DENIM also boosts and shares the idea of using fusion-generated neutrons in fusion-fission systems (LIFE) and also as material irradiation source.

The Institute takes part in different projects with competitive public funding (National Plan, CONSOLIDER Projects, design of National Singular Facilities such as TECHNOFUSION, European Framework Programme and European ESFRI projects: HiPER and ELI) and it also maintains many direct collaboration agreements with national and international centres/institutions.

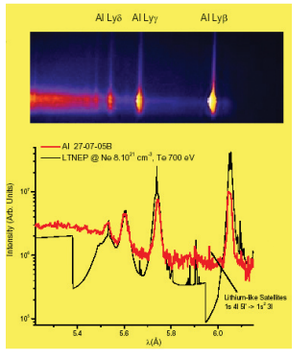
Instituto de Fusión Nuclear

INSTITUTE OF NUCLEAR FUSION

RESEARCH LINES

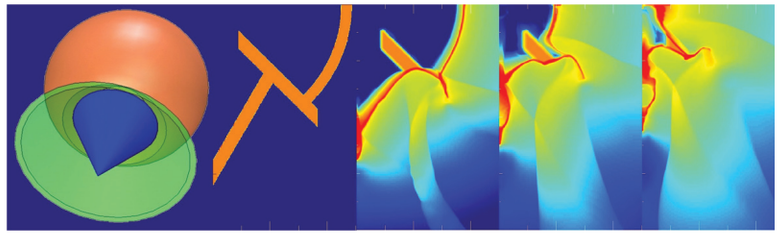
INERTIAL NUCLEAR FUSION

- Hydrodynamics and radiation
- Atomic Physics
- Target Design



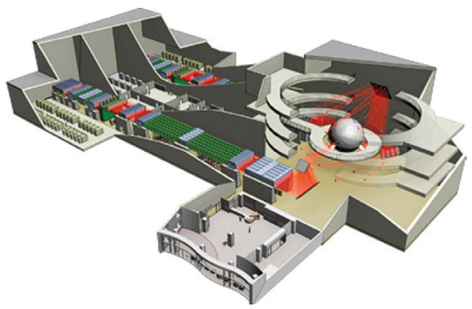
Atomic Physics: Computational reproduction with LTNEP code of experiments carried out at LULI (E. Dalimier, 2005) of the absorption lines in a homogeneous plasma showing a very good agreement between them.

Target Design: One of the earliest designs carried out (2002) with 2D ARWEN code, of a fast fusion target with only one driver.



VERY INTENSE LIGHT SOURCES

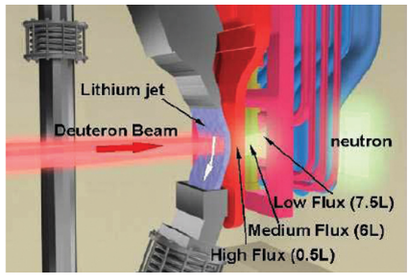
- Femtosecond and attosecond lasers
- Applications to solid-state visualization and biology



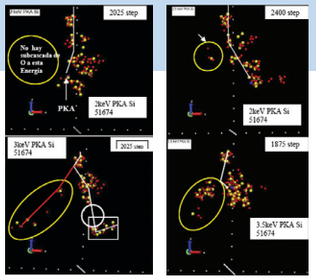
DESIGN OF FAST-IGNITION LASER FUSION REACTORS, HiPER

FUSION TECHNOLOGY

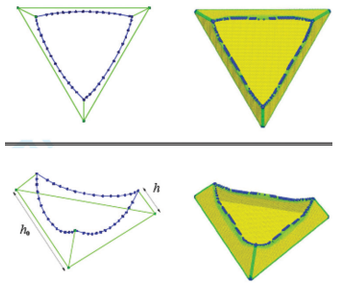
- Activation and Security
- Materials
- Tritium
- Breeder blankets and systems in fusion power plants



Activation and security: Study of the *International Fusion Material Irradiation Facility* (IFMIF) project within the development of the ITER accompanying programme.



Materials: Multi-scale computational simulation of advanced and under-radiation materials.



ACCELERATOR-DRIVEN RADIOACTIVE WASTE TRANSMUTATION SYSTEM AND ADVANCED FISSION REACTORS

Accelerator: This figure shows the thermal analysis of the ADS subcritical system for radioactive waste transmutation in the IP EUROTRANS project, starting point for the thermomechanical analysis, by using subcritical system kinetic simulation.