MOTIVATING YOUNG STUDENTS TO BE PART OF THE GLOBAL RESEARCH IN NUCLEAR THROUGH THE SEMINAR OF NUCLEAR FUSION

G. JIMENEZ, R. OCHOA, A.BARBAS
Jóvenes Nucleares (Spanish Young Generation in Nuclear, JJNN)
Campoamor 17, 28004 Madrid, Spain
gonzalo.jimenez@jovenesnucleares.org

ABSTRACT

Jóvenes Nucleares (Spanish Young Generation in Nuclear, JJNN) is a non-profit organization that depends on the Spanish Nuclear Society (SNE). The Universidad Politécnica de Madrid (Technical University of Madrid, UPM) was chosen to host the Seminar as it is one of the most prestigious technical universities of Spain, and has a very strong curriculum in nuclear engineering training and research.

Both, the UPM and the SNE, supported strongly the seminar: the opening session was conducted by the member of to board of directors of the Spanish Nuclear Society and Nuclear Engineering professor of the UPM, Emilio Mínguez and the closing session was conducted by the director of the Nuclear Fusion Institute (UPM).

1. Introduction

Jóvenes Nucleares (Spanish Young Generation in Nuclear, JJNN) is a non-profit organization that depends on the Spanish Nuclear Society (SNE). The Universidad Politécnica de Madrid (Technical University of Madrid, UPM) was chosen to host the Seminar as it is one of the most prestigious technical universities of Spain, and has a very strong curriculum in nuclear engineering training and research.

Finishing 2011, JJNN and the UPM started to plan a new and first-of-a-kind Seminar in Nuclear Fusion. That Seminar was highly demanded by the Young Generation People for the last years, due to the need of information motivated by the huge fusion projects on-going in the world (ITER, NIF, etc.).

2. The Motivation

The goal of the Seminar was to give an overview of the nuclear fusion fundamentals and technology, introducing the audience to the research projects in nuclear. That was a great driver of the course as the participants were able to see what challenges are being faced and how much effort is being made in the energy research field. Their feedback told that it was motivating experience for them.

After a great effort from JJNN with the support of the UPM, the Seminar took place in November 2011 at the Industrial Engineering School (ETSII). The lessons were conducted by expert researchersin the field, who belong to the Nuclear Fusion Institute at the UPM.

3. The Development of the Seminar

The Seminar was structured in four sessions: introduction to the nuclear fusion fundamentals, inertial confinement nuclear fusion, magnetic confinement nuclear fusion and overview of the projects in nuclear fusion.

In the first presentation, Alberto Fraile clearly explained the beginnings and foundations of fusion technology, not excluding the references to the non-civil origins. The presentation included several videos and stories, with many interventions of the public in the question time.

The next presentation was developed by Manuel Cotelo, which clearly reflected the theoretical foundations of inertial confinement fusion technology and hinted ongoing projects and future prospects of this technology.

Later, Antonio Rivera introduced to attendees in the complex technology of magnetic confinement fusion, addressing its strengths and challenges, as well as deepen the theoretical concepts of this technology.

Finally, in the last session, Jesus Alvarez made a broad perspective of past, present and future projects of both technologies, highlighting the projects in which there are Spanish participants.

In the 2012 edition, thanks to the kindness of Santiago Sánchez-Cervera, the seminar was finished with a very interesting visit to the TJ-II Stellarator at CIEMAT facilities. That is why, besides the gratitude to the Technical University of Madrid, and in particular to the Superior Technical School of Industrial Engineers for the assignment of space we extend the CIEMAT, who very kindly attended the visit.

4. Conclusions

The seminar was very popular, with nearly 80 attendees each day, from the university, nuclear companies and research centers. After each session there were very interesting and animated discussions between the presenters and the public that demonstrated the interest of the attendees for the subjects taught.

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The assistants were asked for a highly detailed feedback of each one of the lessons and those opinions have helped to review the program for the 2012 and 2013 Seminars, which took place also in November at UPM as well.

Figure 1. Public at the Nuclear Fusion Seminar

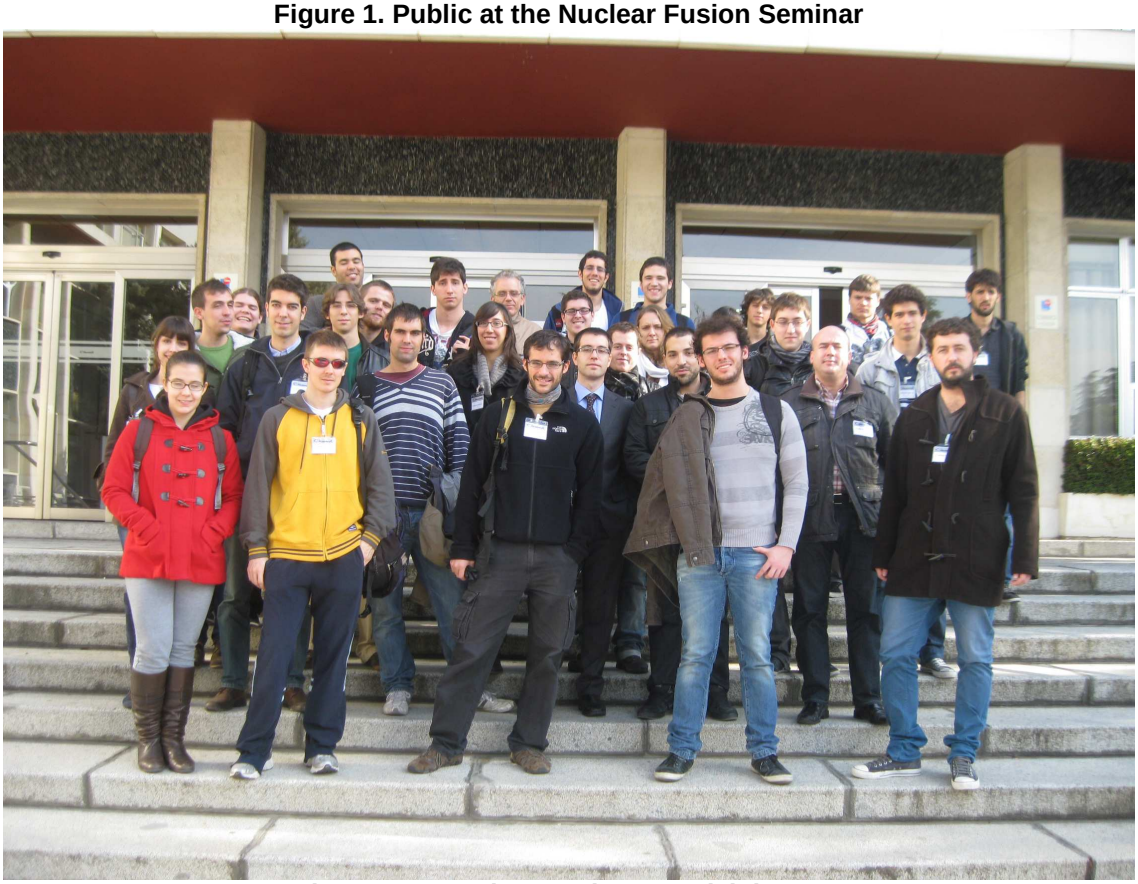


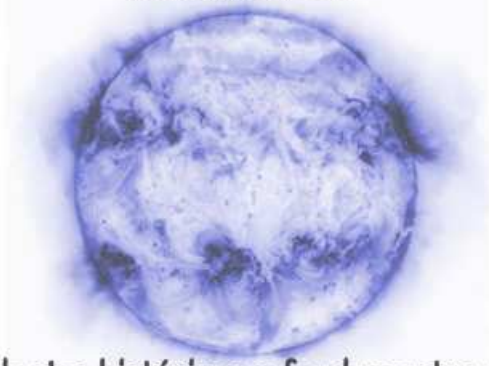
Figure 2. Attendees to the TJ-II visit in 2012

jóvenes nucleares

INDUSTRIALES ETSII | UPM

Seminarios de Fusión Nuclear

Universidad Politécnica de Madrid - ETSII
José Gutiérrez Abascal 2, Madrid
Noviembre 2011



Día 21 Antecedentes históricos y fundamentos de la fusión
17:30-19:30 Aula C — Fusión en las estrellas, Reacciones fusión (D-D, D-T, otros...), Recursos y sostenibilidad: autoproducción de tritio, Necesidad y tipos de un confinamiento,

Día 23 Fusión por confinamiento inercial
17:30-19:30 Aula C — Descripción del confinamiento inercial, Requisitos para ignición, Etapas, Targets (cápsulas, Hohlraum), Tipos de iluminación(directa/indirecta),

Día 28 Fusión por confinamiento magnético
17:30-19:30 Aula C — Descripción del confinamiento magnético, Tokamak vs Stellarator, Componentes reactor, Desafíos y dificultades por resolver

Día 30 Proyectos en curso y retos futuros
17:30-19:30 Aula C — Perspectivas de futuro, Proyectos conf. Magnético (ITER), Proyectos conf. Inercial (HIPER)

Inscripción y consultas en www.jovenesnucleares.org
Inscripción gratuita. Aforo limitado por orden de inscripción.

Figure 3. Announcement of the first Nuclear Fusion Seminar