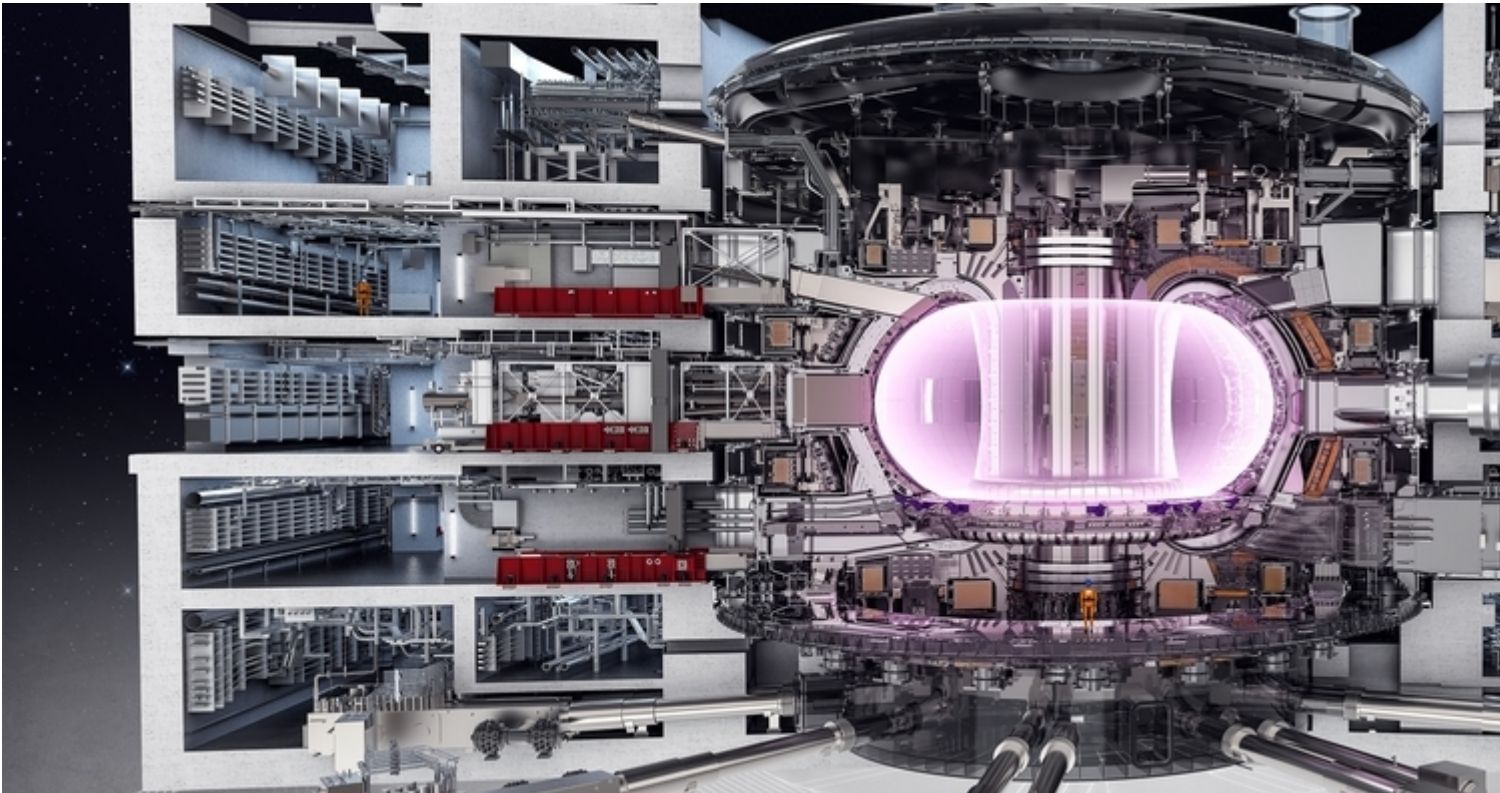


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## [ITER and BSC tighten their collaboration to simulate the process of fusion power generation](#)

A new Memorandum of Understanding also aims to advance the training of young researchers.



The ITER Organization and the Barcelona Supercomputing Center have gone one step further in their collaboration to simulate the process of fusion power generation. Both parties have signed a Memorandum of Understanding (MoU) in which they agree on the importance of promoting and furthering academic and scientific cooperation in all academic and scientific fields of mutual interest and to advance the training of young researchers. ITER is the international nuclear fusion R&D project, which is building the world's largest experimental tokamak in France. Its aims to demonstrate that fusion energy is scientifically and technologically feasible.

ITER and BSC already collaborate in the area of numerical modelling to assess the design of the ITER pellet injector. These computer simulations are based upon non-linear 3D Magnetohydrodynamics (MHD) methods. Their focus is modelling the injection of pellets to forecast and control instabilities that could damage the reactor. These instabilities are called Edge Localized Modes (ELM), which can occur at the boundary of the fusion plasma and are problematic because they can release large amounts of energy to the reactor wall, wearing it away in the process. The goal of these simulations is to assess the optimal pellet size and speed of the pellet injector.

The MoU is valid for a duration of 5 years and tightens the cooperation between the two institutions, leaders in their respective fields, further. ITER will become the biggest and most relevant fusion device in the world while BSC, with its 475 researchers and experts and the upgrade of MareNostrum 3 to MareNostrum 4 that will take place later this year, is one of the top supercomputing centers worldwide. As the first step within this new MoU, the two institutes will start a collaboration on the ITER Integrated Modelling infrastructure, IMAS, together with the EUROfusion Work Package for Code Development.

## Mervi Mantsinen

[The Barcelona Supercomputing Center Fusion team](#) is coordinated by Mervi Mantsinen, ICREA professor at BSC from October 2013. During this time, Mantsinen has been one of the scientific coordinators for the EUROfusion experimental campaign to prepare fusion at ITER. Mantsinen has coordinated one of the two largest experiments for 2015-2016 at the Joint European Torus (JET), the biggest and most powerful fusion reactor in the world and is assisting the design and construction of ITER. Previously Mantsinen worked at JET and the ASDEX Upgrade tokamak at the Max-Planck Institute for Plasma Physics in Garching, Germany.

Mantsinen's research focuses on the numerical modelling of experiments in magnetically confined fusion devices in preparation for ITER operation. Her objective is to enhance modelling capabilities in the field of fusion through code validation and optimization. This research is done within the European fusion research program EUROfusion for Horizon 2020 in close collaboration with ITER, the International Tokamak Physics Activity, EUROfusion and the Spanish national fusion laboratory CIEMAT.

## About

[ITER](#) is the international nuclear fusion R&D project, which is building the world's largest experimental tokamak nuclear fusion reactor in France. ITER aims to demonstrate that fusion energy is scientifically and technologically feasible by producing ten times more energy than is put in.

**Fusion energy** is released when hydrogen nuclei collide, fusing into heavier helium atoms and releasing tremendous amounts of energy in the process. ITER is constructing a tokamak device for the fusion reaction, which uses magnetic fields to contain and control the plasma – the hot, electrically charged gas that is produced in the process.

[EUROFUSION](#) is the 'European Consortium for the Development of Fusion Energy' and manages and funds European fusion research activities. The EUROfusion consortium is composed of the member states of the European Union plus Switzerland as associated member.

[Fusion for Energy \(F4E\)](#) is the EU organisation managing Europe's contribution to ITER. It was established in April 2007 for a period of 35 years. Its seat is in Barcelona.

[The Joint European Torus \(JET\)](#) located at the Culham Centre for Fusion Energy in Oxfordshire, Great Britain. JET is presently the largest and most powerful fusion reactor in the world and studies fusion in conditions approaching those needed for a fusion power plant.

(Caption 1 above: Iter Tokamak and plant Systems, 2016. Credit © ITER Organization).



(Caption 2: Team of the ITER-BSC Expert Contract. Right to left Alberto Loarte, Guido Huijsmans (both ITER), Shimpei Futatani (BSC) and Mervi Mantsinen (ICREA-BSC).

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