

Headline

10 HTS CLs arrive at Naka site



8 of the 10 HTS CLs in their transportation boxes during the final acceptance check at KIT

At Karlsruhe Institute of Technology (KIT) in Germany, following the successful cold test of 4 high temperature superconductor current leads (HTS CLs) in September 2016, the final acceptance of a batch of 10 CLs took place in the presence of the F4E responsible officer on 1 December 2016 (see figure). The acceptance comprised the checks of the CL instrumentation and of the associated documentation. The 10 HTS CLs and their auxiliary components, which will be required for the final assembly, were packed in 7 wooden boxes. In order to minimise the risk of damage to those sensitive devices, each box was mounted on shock-absorbing pads. In addition, the CLs and boxes were monitored by acceleration and tilting sensors to see whether they experienced any excessive loads on their journey. In order to further reduce the risk of damage in transit, it was decided to ship the whole freight by air.

After they arrived at Narita airport in Japan, QST took care of the customs clearance and the final transport to the QST Naka site, where they arrived safely on 19 December 2016. Fuji Electric Co., Ltd., the contractor of the coil terminal boxes for the poloidal field coils, then took them over for integration.

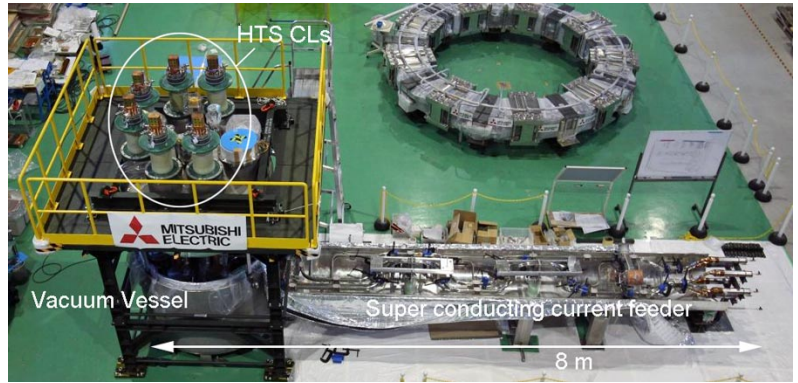
In total, KIT is contributing 26 CLs for the toroidal and poloidal field coils of JT-60SA. The 6 for the TF coils were already delivered in March and October 2015. Fabrication and testing of the remaining 10 CLs are proceeding at KIT. The assembly of PF11 to PF16 (in the overall HTS CL numbering system of JT-60SA) has already finished. PF17 to PF20 are now being manufactured. Last autumn, PF11 and PF12 were successfully tested at the test facility - "CuLTka". After the integration of PF13 to PF16 at the test facility, the cold test began in February 2017.

News

Coil terminal box 1 manufacturing



HTS CLs installed in the CTB1



Side view of the CTB1 in manufacturing

The coil terminal boxes (CTBs) are used to connect the superconducting coils to the power supplies. They house the high temperature superconductor current leads (HTS CLs), manufactured by Karlsruhe Institute of Technology in Germany, which reduce heat flow from room temperature to the cryogenic temperature of the coils. The CTBs for the toroidal field coil and the poloidal field coil CLs are being produced in Japan by Mitsubishi Electric Corporation (Mitsubishi) and Fuji Electric Co., Ltd., respectively.

The CTB1 (in the overall CTB numbering system of JT-60SA) by Mitsubishi is being manufactured at the QST Naka site. The assembly of the vacuum vessel of the lower part and superconducting current feeders has already been finished. In January 2017, the TF coil HTS CLs were installed in CTB1 and connected to the superconducting current feeder (see figures).

The assembly of the vacuum vessel of the upper part and of the cooling pipes are ongoing. The CTB1 will be completed by the end of February 2017.

News

Cryogenic system operation training by ALAT



Figure 1: Classroom lecture ongoing



Figure 2: Hands-on training to start the compressor in the warm compressor system building

On 16 - 20 January 2017, Air Liquide Advanced Technology (ALAT) gave QST training concerning the operation of the cryogenic system they delivered to the QST Naka site through a contract with CEA.

The training started with a lecture (Figure 1) on safety education, followed by the instructions for the human-machine interface, the method of conditioning, and detailed sequences for operation. The main sequence of the cryogenic system consists of 2 kinds of cool-downs, purification, short term stand-by (STS), baking (BAK), 2 nominal modes, regeneration, quench, and warm-up. In the lecture, ALAT also explained troubleshooting as well as an emergency sequence, which will be automatically launched in case that a major trip of the refrigeration cold box (RCB) occurs. The lecture was followed by practical hands-on training (Figure 2) for the QST experts to acquire the methods of conditioning, starting/shutting of the main helium compressors, and maintenance of the RCB.

As a result of the lecture, QST experts managed to run all the compressors and successfully performed a high pressure interlock test by themselves. The training was very informative and useful for QST to improve their cryogenic system operation skills.

News

Multi-layer insulation for bottom CTS delivered to Naka



Delivered MLI for the bottom CTSs

The cryostat thermal shields (CTSs) surround the superconducting magnets, and shield them from the radiation from the cryostat and other external components at room temperature (about 300 K).

The CTS has a cooling pipe through which 80 K gaseous helium flows. In addition, multi-layer insulation (MLI) will be installed in the space between the CTSs and cryostat to reduce the heat radiation from the cryostat. The JT-60SA MLI is a multi-layered polyethylene film with evaporated aluminium coated on both sides. Further, a polyimide film covers the surfaces for protection and electric insulation. It has slits at the aluminium-evaporated parts in order to reduce eddy current heating during variation of the magnetic field under JT-60SA operation.

The MLI for the bottom CTS arrived at the QST Naka site in September 2016 (see figures) and will be installed in 2018. All of the remaining MLI for the top and middle CTSs will be delivered by May 2018.

News

Prof. H. Zohm and M. Ono visit Naka site

Professors H. Zohm (Max Planck Institute for Plasmaphysics, Germany) and M. Ono (Princeton Plasma Physics Laboratory (PPPL), USA) visited the QST Naka site on 26 and 30 January 2017, respectively. They were invited to the Large Tokamak Seminars hosted by QST Naka Institute.

Professor H. Zohm gave a presentation entitled "Recent research on ASDEX Upgrade". ASDEX Upgrade has focused on the preparation of operation scenarios for ITER and DEMO as well as the demonstration of a viable exhaust scenario for the conditions expected in those devices. The core mission of the research is to obtain fundamental understanding of the underlying physics in order to safely apply the findings in ASDEX Upgrade to ITER and DEMO. He presented an overview of the recent research results in those areas and discussed those impacts on the operation of ITER as well as the design and operation of the future DEMO reactor.

Professor M. Ono gave a presentation entitled "Initial results from National Spherical Torus Experiment Upgrade (NSTX-Upgrade) and possible areas of research collaboration on JT-60SA". The NSTX-Upgrade is a low-aspect-ratio tokamak facility at PPPL. The unique operating regimes of NSTX-U can contribute to resolve important physics issues for ITER operation. With doubled magnetic fields and heating power compared to those of NSTX, NSTX-U was designed to attain fully non-inductive operation at the high plasma beta needed for future reactors. He presented the highlights of the first NSTX-U campaign in 2016 and its long-term goals.

Professors Zohm and Ono also toured the JT-60SA facilities, and then discussed possible areas of collaboration with JT-60SA.



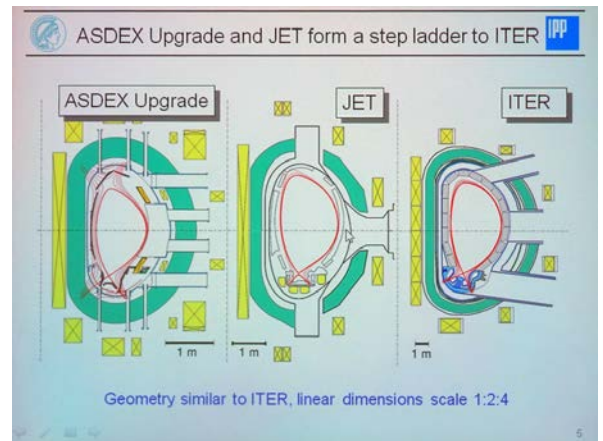
Professor H. Zohm and his presentation

Max-Planck-Institut für Plasmaphysik IPP

Recent ASDEX Upgrade Results in Support of ITER and DEMO

Hartmut Zohm
for the ASDEX Upgrade /EUROfusion MST1 Teams*
Max-Planck-Institut für Plasmaphysik, Garching, Germany
*see e.g. appendix of H. Zohm et al, Nucl. Fusion 55 (2015) 104010

Presented at JT60SA seminar, Naka, Japan, 26.01.2017



Professor M. Ono and his presentation

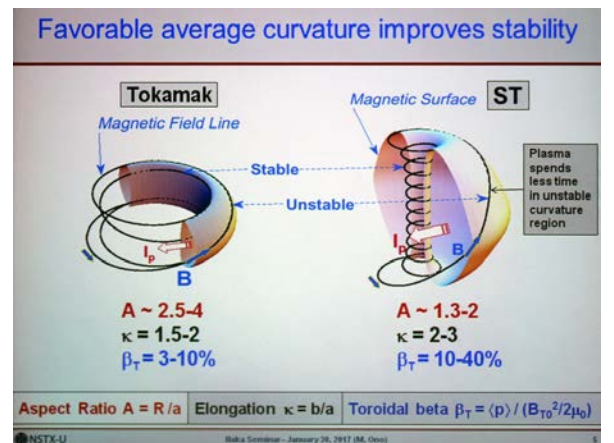
U.S. DEPARTMENT OF ENERGY Office of Science NSTX-U

Initial Results from NSTX Upgrade and Possible Areas of Scientific Collaboration with JT-60SA

Masayuki Ono
PPPL, Princeton University

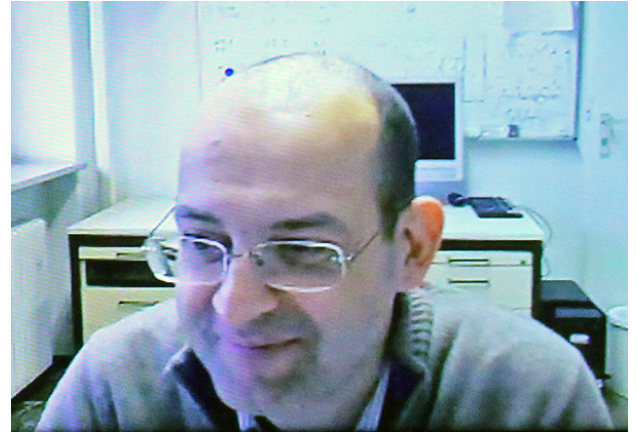
Naka-JT-60SA Visit
January 30, 2017

PPPL



Meeting

3rd DRM on RWM control coil power supply



The power supply system for the resistive wall mode (RWM) control coils of JT-60SA (RWM-PS) is procured by Consorzio RFX through a contract awarded to the Italian company, Equipaggiamenti Elettronici Industriali S.p.A. (EEI).

The RWM-PS includes a step-down transformer, 2 rectifier systems and 18 fast inverters, individually supplying the 18 RWM control coils - in-vessel sector coils with the aim of controlling the RWM instabilities.

A dedicated design review meeting (DRM) was held on 20 December 2016, with the participation of EEI, Consorzio RFX, F4E and QST experts to review and comment on the final design report (FDR). The outcome of the DRM was extremely positive: the participants agreed that the design was mature enough for the release of the next manufacturing phase and that the FDR was properly detailed and satisfactory.

The manufacturing of the input stage and of the first unit of the 18 inverters is planned in the first half of 2017, and the type tests are expected during the second half of the year.

Local

Welcome to Japan Frello family



Mr. G. Frello at the F4E Naka office

* This article was contributed by Dr. G. Frello of F4E.

Do you believe in destiny? Until a few months ago, I didn't.

It was the year of 1997. During the final stage of my graduation at Padova University (Italy), I applied for a scholarship to come to Naka to work on the ITER project. In fact, I graduated as an electrical engineer with specialization in Nuclear Fusion Technology, working on a thesis at Consorzio RFX in Padova.

Unfortunately, I was not granted the scholarship, and my dream to come to work in Japan was, I thought, "definitely" buried. I then started to work in the field of Power Transmission, and later joined a big company in the field of Oil & Gas, and began to travel all around the world (Saudi Arabia, Nigeria, India, Canada and many others) with my family, covering important positions within the company.

But to come to Naka and to work in the field of nuclear fusion should have been evident in my destiny, and, a few months ago, I had the opportunity to join F4E. I immediately accepted the offer because of the possibility to work for one of the most important and possibly future shaping projects on the planet Earth, that is, JT-60SA. So, after 20 years, my destiny was finally met!

So, here I am, a 45-years-old Italian guy, with a beautiful wife and 3 wonderful children of 13, 9 and 1 year old, living in Tsukuba (for school reasons), and enjoying Japan! In these past 3 months in Japan, we have already visited Tokyo a couple of times and enjoyed a 1 week stay in Kyoto.

I like running and I hope to run my 5th marathon this year in Japan. I also love "Puroresu", the professional wrestling matches of Japan. I'm a big fan of the new Japan pro-wrestling (NJPW) group, and I really hope to meet Satoru Sayama, who in Italy, for the fans of the sport, is respected as a legend (he is also well-known as the Tiger Mask among Japanese).

The big challenge for me is to learn Japanese. But give me one year, and I might even be able to greet you when we meet :-D



Frello family at Hitachi Seaside Park near Naka when the kochia bushes turned red in autumn

Calendar

21 March 2017

20th Meeting of the STP Project Committee (PC-20)
Naka, Japan

27 April 2017

20th Meeting of the BA Steering Committee (SC-20)
Rokkasho, Japan

14 – 18 May 2017

25th International Conference on Nuclear Engineering (ICONE 2017)
Shanghai, China

22 – 26 May 2017

6th Research Coordination Meeting (RCM-6)
Naka, Japan

4 – 8 June 2017

27th IEEE Symposium on Fusion Engineering (SOFE 2017)
Shanghai, China

Contact Us

The JT-60 Newsletter is released monthly by the JT-60SA Project Team.

Suggestions and comments are welcome and can be sent to newsletter@jt60sa.org.

For more information, please visit the website: <http://www.jt60sa.org/>.