

## Agenda

## A3 Foresight Summer School and Workshop on Spherical Torus (ST) 2014

**June 30- July 4, 2014**

## Kensington Resort, Jeju, Korea

### **June 30 (Monday)**

**18:00- 20:00      Registration and Welcome Reception**

**July 1 (Tuesday)**

**9:00- 9:10      Opening**      Y.S. Hwang (SNU, Korea),  
M. Inomoto (Tokyo U, Japan) and Z. Gao (Tsinghua U, China)

## 9:10-10:40 ST Overview

9:10-9:50 Spherical Tokamak: History and Future I Y.M. Peng (USA)

10:00-10:40 Spherical Tokamak: History and Future II Y.M. Peng (USA)

**10:40-11:00      Coffee Break**

11:00-12:30      **Basic Fusion Plasma Physics**

11:00-11:40	Basic Fusion Plasma Physics I	Y.S. Na (SNU)
-------------	-------------------------------	---------------

11:50-12:30	Basic Fusion Plasma Physics II	Y.S. Na (SNU)
-------------	--------------------------------	---------------

**12:30-14:20      Lunch**

**14:20-15:50      RF Heating and CD**

14:20-15:00	TST-2 and LHW experiments	Y. Takase (Univ. of Tokyo)
-------------	---------------------------	----------------------------

15:10-15:50 ICRF S.H. Kim (KAERI)

**15:50-16:10      Coffee Break**

**16:10-17:50      EC/EBW H&CD**

16:10-16:50 EC/EB heating and current drive I T. Maekawa (Kyoto Univ.)

17:00-17:50	EC/EB heating and current drive	II	T. Maekawa (Kyoto Univ.)
-------------	---------------------------------	----	--------------------------

## **July 2 (Wednesday)**

**9:00- 12:00      Joint Session with APPTC**

**12:00-13:30      Lunch**

**13:30-15:40      Plasma Diagnostics**

13:30-14:10      Plasma Diagnostics I      A. Ejiri (Univ. of Tokyo)

14:20-15:00      Plasma Diagnostics II      A. Ejiri (Univ. of Tokyo)

**15:00-15:20 Coffee Break**

**15:20-17:50      RF heating and CD**

15:20-16:00      Principle of RF heating and current drive I      Z. Gao(Tsinghua Univ.)

16:00-16:50      Principle of RF heating and current drive II      Z. Gao(Tsinghua Univ.)

17:00-17:50      Helicity Injection      Y.S. Hwang (SNU)

## **July 3 (Thursday)**

**9:30-10:40      Plasma Simulation**

9:30-10:10      Elements of Tokamak Plasma Simulation      A.Fukuyama(Kyoto Univ.)

10:20-11:00      Simulation of RF Heating and Current Drive Fukuyama (Kyoto Univ.)

11:10-12:00      Fusion Energy Application and Its Possible Future Market

S. Konishi (Kyoto Univ.)

**12:00-13:30 Lunch**

**13:30-16:10      NBI and Merging Startup**

13:30-14:10      Basic Physics of NBI      M. INOMOTO(Univ. of Tokyo)

14:20-15:00      Engineering of NBI for high beta plasmas      INOMOTO(Univ. of Tokyo)

15:10-15:50      Merging Startup of Spherical Tokamak Plasmas Y. Ono (Univ. of Tokyo)

**16:00-18:00      Student Poster Session**

**19:00-21:00      Poster Award and Student Night**

## **July 4 (Friday)**

**9:00- 12:00      Discussion and Closing**

.....

**Student Poster Session (Thursday 16:00-18:00)**

**P1. Nozawa Yoshitaka**, Graduate School of Energy Science, Kyoto Univ.

“Recent results from microwave spherical torus experiment on LATE”

**P2. Natsuhiko Hamada**, Interdisciplinary Graduate School of Engineering Sciences, Kyushu Univ., “Heat load measurements with water cooled movable limiters in long duration plasmas on QUEST”

**P3. Miura Hiroki**, Interdisciplinary Graduate School of Engineering Sciences, Kyushu Univ., “Breakdown of 2nd harmonic ECRH on QUEST”

**P4. Honma Hiroto**, Graduate School of Frontier Sciences, The University of Tokyo, “Thomson Scattering in QUEST”

**P5. Nakamura Kenta**, Graduate School of Frontier Sciences, The University of Tokyo, “Design of Hard X-ray measurement system for TST-2”

**P6. Takeuchi Toshihiro**, Graduate School of Science, The University of Tokyo, “Spectroscopic measurement of impurity radiation in tokamak plasmas”

**P7. Yajima Satoru**, Graduate School of Science, The University of Tokyo, “AXUV array measurement in TST-2”

**P8. Yoshida Yusuke**, Graduate School of Science, The University of Tokyo, “Electron density measurements of non-inductive start-up plasmas using an interferometer”

**P9. Yamasaki Kotaro**, Graduate School of Engineering, The University of Tokyo, “Floating potential measurement during magnetic reconnection with strong guide field in the UTST merging experiment”

**P10. Kaminou Yasuhiro**, Graduate School of Engineering, The University of Tokyo, “Non-MHD effect on counter-helicity reconnection in weakly magnetized region”

**P11. Kato Joji**, Graduate School of Engineering, The University of Tokyo, “Toroidal mode measurement of merging ST”

**P12. Ushiki Tomohiko**, Graduate School of Frontier Sciences, The University of Tokyo, “Observation of Soft X-ray Emission during Spherical Tokamak Merging in UTST”

**P13. Guo Xuehan**, Graduate School of Frontier Sciences, The University of Tokyo, “Electron heating during magnetic reconnection in UTST plasma merging experiment”

**P14. Kitazumi Kota**, Graduate School of Frontier Sciences, The University of Tokyo, "Two-dimensional Thomson scattering measurement for TS-4"

**P15. Koike Hideya**, Graduate School of Frontier Sciences, The University of Tokyo, "Ion Heating Characteristics of Merging Spherical Tokamak Plasmas using the Doppler Tomography"

**P16. TAN Yi**, Department of Engineering Physics, Tsinghua University, "Recent progress of plasma diagnostics in SUNIST"

**P17. ZHAO Aihui**, Department of Engineering Physics, Tsinghua University, "Parametric Instabilities in Inhomogeneous Plasmas during Lower Hybrid Waves Injection into Tokamaks"

**P18. LIU Yangqing**, Department of Engineering Physics, Tsinghua University, "Experimental techniques development for investigating Alfvén wave in the SUNIST Spherical Tokamak"

**P19. CHAI Song**, Department of Engineering Physics, Tsinghua University, "Movable multi-probes for plasma boundary measurement in SUNIST"

**P20. LI Yang**, Department of Engineering Physics, Tsinghua University, "Collisional damping and frequency of the geodesic acoustic mode"

**P21. LIU Zhiyuan**, Department of Engineering Physics, Tsinghua University, "Preliminary study on electromagnetic effects on parametric instabilities of lower hybrid waves"

**P22. KE Rui**, Department of Engineering Physics, Tsinghua University, "Shielding effects of Langmuir probe diagnostics"

**P23. KIM, Yoosung**, Dept. of Nuclear Engineering, Seoul National University, "Study on liquid target for neutron generator"

**P24. PARK Jong Yoon**, Dept. of Nuclear Engineering, Seoul National University, "Experiment and Design of The Pulsed Electron Source for Helicity Injection in VEST"

**P25. YANG, Jeong-hun**, Dept. of Nuclear Engineering, Seoul National University, "Current Density Profile Measurement using Small Hall Sensors in VEST"

**P26. LEE Kern**, Dept. of Nuclear Engineering, Seoul National University, "Correlation between shockwave and wire properties in the wire initiated electrical discharges in water"

**P27. LEE, HyunYeong and JO, JongGab**, Dept. of Nuclear Engineering, Seoul National University, "ECH/EBW experiments in VEST"

- P28. CHUNG, Kyoung Soo**, Dept. of Nuclear Engineering, Seoul National University,  
“Simulation and control of ELM-like plasma jet generated by a pulsed plasma gun”
- P29. JO, Jung Min**, Dept. of Nuclear Engineering, Seoul National University,  
“Preliminary Study for Soft X-ray Spectroscopy in VEST”
- P30. CHOI Dahye**, Dept. of Nuclear Engineering, Seoul National University, “Full  
wave analysis of ECH in VEST”
- P31. LEE JeongWon**, Dept. of Nuclear Engineering, Seoul National University,  
“Equilibrium analysis of VEST ohmic plasma using finite element method”
- P32. KIM, Young-gi**, Dept. of Nuclear Engineering, Seoul National University,  
“Design and Installation of AXUV Photodiode Array with H-alpha Band Pass Filter”
- P33. YANG SeongMoo**, Dept. of Nuclear Engineering, Seoul National University,  
“Development of mach probe for the ion flow measurement in VEST”
- P34. SOHN Jung Hoon**, Dept. of Nuclear Engineering, Seoul National University,  
“Density limit studies in KSTAR”

.....

## List of Participants

### USA:

Dr. PENG, Y.M.K.

ORNL, USA

Email: [pengykm2@gmail.com](mailto:pengykm2@gmail.com)

### Japan:

Prof. INOMOTO, Michiaki

Graduate School of Frontier Sciences, The University of Tokyo

Email: [inomoto@k.u-tokyo.ac.jp](mailto:inomoto@k.u-tokyo.ac.jp)

Prof. ONO, Yasushi

Graduate School of Frontier Sciences, The University of Tokyo

Email [ono@k.u-tokyo.ac.jp](mailto:ono@k.u-tokyo.ac.jp)

Prof. TAKASE, Yuichi

Graduate School of Frontier Sciences, The University of Tokyo

Email: [takase@k.u-tokyo.ac.jp](mailto:takase@k.u-tokyo.ac.jp)

Prof. EJIRI, Akira

Graduate School of Frontier Sciences, The University of Tokyo

Email: [ejiri@k.u-tokyo.ac.jp](mailto:ejiri@k.u-tokyo.ac.jp)

Prof. MAEKAWA, Takashi

Kyoto University

Email: [maekawa@energy.kyoto-u.ac.jp](mailto:maekawa@energy.kyoto-u.ac.jp)

Prof. FUKUYAMA, Atsushi

Graduate School of Engineering, Kyoto University

Email: [fukuyama@nucleng.kyoto-u.ac.jp](mailto:fukuyama@nucleng.kyoto-u.ac.jp)

Prof. SATOSHI, Konishi  
Institute of Advanced Energy, Kyoto University  
Email: [s-konish@iae.kyoto-u.ac.jp](mailto:s-konish@iae.kyoto-u.ac.jp)

Mr. NOZAWA, Yoshitaka  
Graduate School of Energy Science, Kyoto University  
Email: [nozawa44tk.ht24.soccer@gmail.com](mailto:nozawa44tk.ht24.soccer@gmail.com)

Mr. NISHIYAMA, So  
Interdisciplinary Graduate School of Engineering Sciences, Kyushu University  
Email: [nishiyama@triam.kyushu-u.ac.jp](mailto:nishiyama@triam.kyushu-u.ac.jp)

Mr. NATSUHIKO, Hamada  
Interdisciplinary Graduate School of Engineering Sciences, Kyushu University  
Email: [n.hamada@triam.kyushu-u.ac.jp](mailto:n.hamada@triam.kyushu-u.ac.jp)

Mr. MIURA, Hiroki  
Interdisciplinary Graduate School of Engineering Sciences, Kyushu University  
Email: [miura@triam.kyushu-u.ac.jp](mailto:miura@triam.kyushu-u.ac.jp)

Mr. HONMA, Hiroto  
Graduate School of Frontier Sciences, The University of Tokyo  
Email: [honma@fusion.k.u-tokyo.ac.jp](mailto:honma@fusion.k.u-tokyo.ac.jp)

Mr. NAKAMURA, Kenta  
Graduate School of Frontier Sciences, The University of Tokyo  
Email: [nakamura\\_k@fusion.k.u-tokyo.ac.jp](mailto:nakamura_k@fusion.k.u-tokyo.ac.jp)

Mr. TAKEUCHI, Toshihiro  
Graduate School of Science, The University of Tokyo  
Email: [takeuchi@fusion.k.u-tokyo.ac.jp](mailto:takeuchi@fusion.k.u-tokyo.ac.jp)

Mr. YAJIMA, Satoru  
Graduate School of Science, The University of Tokyo  
Email: [yajima@fusion.k.u-tokyo.ac.jp](mailto:yajima@fusion.k.u-tokyo.ac.jp)

Mr. YOSHIDA, Yusuke  
Graduate School of Science, The University of Tokyo  
Email: [yoshida@fusion.k.u-tokyo.ac.jp](mailto:yoshida@fusion.k.u-tokyo.ac.jp)

Mr. YAMASAKI, Kotaro  
Graduate School of Engineering, The University of Tokyo  
Email: [yamasaki@ts.t.u-tokyo.ac.jp](mailto:yamasaki@ts.t.u-tokyo.ac.jp)

Mr. KAMINO, Yasuhiro  
Graduate School of Engineering, The University of Tokyo  
Email: [kaminou@ts.t.u-tokyo.ac.jp](mailto:kaminou@ts.t.u-tokyo.ac.jp)

Mr. KATO, Joji  
Graduate School of Engineering, The University of Tokyo  
Email: [katou@ts.t.u-tokyo.ac.jp](mailto:katou@ts.t.u-tokyo.ac.jp)

Mr. USHIKI, Tomohiko  
Graduate School of Frontier Sciences, The University of Tokyo  
Email: [ushiki@ts.t.u-tokyo.ac.jp](mailto:ushiki@ts.t.u-tokyo.ac.jp)

Mr. GUO, Xuehan  
Graduate School of Frontier Sciences, The University of Tokyo  
Email: [guo@ts.t.u-tokyo.ac.jp](mailto:guo@ts.t.u-tokyo.ac.jp)

Mr. KITAZUMI, Kota  
Graduate School of Frontier Sciences, The University of Tokyo  
Email: [kitazumi@ts.t.u-tokyo.ac.jp](mailto:kitazumi@ts.t.u-tokyo.ac.jp)

Mr. KOIKE, Hideya  
Graduate School of Frontier Sciences, The University of Tokyo  
Email: [koike@ts.t.u-tokyo.ac.jp](mailto:koike@ts.t.u-tokyo.ac.jp)



**China:**

Prof. GAO, Zhe  
Department of Engineering Physics,  
Tsinghua University, Beijing 100084  
Telephone No.: +86-10-62797535/13810006508  
Fax No.: +86-10-62776446-6.  
Email: [gaozhe@tsinghua.edu.cn](mailto:gaozhe@tsinghua.edu.cn)

Dr. TAN, Yi  
Department of Engineering Physics,  
Tsinghua University, Beijing 100084  
Telephone No.: +86-10-62791974  
Fax No.: +86-10-62776446-6.  
Email: [tanyi@sunist.org](mailto:tanyi@sunist.org)

Mr. KE, Rui  
Department of Engineering Physics,  
Tsinghua University, Beijing 100084  
Telephone No.: +86-10-62776446  
Fax No.: +86-10-62776446-6.  
Email: [kerui@sunist.org](mailto:kerui@sunist.org)

Mr. LI, Yang  
Department of Engineering Physics,  
Tsinghua University, Beijing 100084  
Telephone No.: +86-10-62776446  
Fax No.: +86-10-62776446-6.  
Email: [15210580384ly@sina.com](mailto:15210580384ly@sina.com)

Mr. LIU, Zhiyuan  
Department of Engineering Physics,  
Tsinghua University, Beijing 100084  
Telephone No.: +86-10-62776446  
Fax No.: +86-10-62776446-6.  
Email: [lzhiy1990@126.com](mailto:lzhiy1990@126.com)

Mr. LIU, Yangqing  
Department of Engineering Physics,  
Tsinghua University, Beijing 100084  
Telephone No.: +86-10-62797535  
Fax No.: +86-10-62776446-6.  
Email: [liuyq05@gmail.com](mailto:liuyq05@gmail.com)

Ms. CHAI, Song  
Department of Engineering Physics,  
Tsinghua University, Beijing 100084  
Telephone No.: +86-10-62776446  
Fax No.: +86-10-62776446-6.  
Email: [chaisong@sunist.com](mailto:chaisong@sunist.com)

Dr. Zhao Aihui (MS.)  
Department of Engineering Physics,  
Tsinghua University, Beijing 100084  
Telephone No.: +86-10-62776446  
Fax No.: +86-10-62776446-6.  
Email: [zhaoaihui@sunist.org](mailto:zhaoaihui@sunist.org)

Associate Prof. WANG, Wenhao  
Department of Engineering Physics,  
Tsinghua University, Beijing 100084  
Telephone No.: +86-10-62776446  
Fax No.: +86-10-62776446-6.  
Email: [whwang@tsinghua.edu.cn](mailto:whwang@tsinghua.edu.cn)

Prof. FENG, Chunhua  
Institute of Physics, Chinese Academic of Science, Beijing 100190  
Telephone No.: +86-10-82649137/13681312709  
Fax No.: +86-10-62776446-6.  
Email: [chfeng@aphy.iphy.ac.cn](mailto:chfeng@aphy.iphy.ac.cn)

## **KOREA:**

Prof. HWANG, Yong-Seok

Dept. of Nuclear Engineering, Seoul National University

Email: [yhwang@snu.ac.kr](mailto:yhwang@snu.ac.kr)

Prof. HAHM, T. S.

Dept. of Nuclear Engineering, Seoul National University

Email: [tshahm@snu.ac.kr](mailto:tshahm@snu.ac.kr)

Prof. NA, Y. S.

Dept. of Nuclear Engineering, Seoul National University

Email: [ysna@snu.ac.kr](mailto:ysna@snu.ac.kr)

Prof. RYU, Chang-Mo

Department of Physics, POSTECH

Email: [ryu201@postech.ac.kr](mailto:ryu201@postech.ac.kr)

Prof. HAN, Jung-Hoon

CARFRE, Seoul National University

Email: [junghoonhan@snu.ac.kr](mailto:junghoonhan@snu.ac.kr)

Dr. CHUNG, Kyung-Jae

CARFRE, Seoul National University

Email: [jkjlsh1@snu.ac.kr](mailto:jkjlsh1@snu.ac.kr)

Dr. KIM, Sun-Ho

Center for fusion technology development, Korea Atomic Energy Research Institute

Email: [shkim95@kaeri.re.kr](mailto:shkim95@kaeri.re.kr)

Mr. LEE, JeongWon

Dept. of Nuclear Engineering, Seoul National University

Email: [germine@snu.ac.kr](mailto:germine@snu.ac.kr)

Mr. LEE, HyunYeong

Dept. of Nuclear Engineering, Seoul National University

Email: [brbbebbero@snu.ac.kr](mailto:brbbebbero@snu.ac.kr)

Prof. YOON, Han Ki  
Dong-Eui University  
Email: [hkyoon@deu.ac.kr](mailto:hkyoon@deu.ac.kr)

Prof. LEE, Heon-Ju  
Jeju National University  
Email: [hjlee@jejunu.ac.kr](mailto:hjlee@jejunu.ac.kr)

Mr. YANG, Jong-Keun  
Jeju National University  
Email: [jkyang@jejunu.ac.kr](mailto:jkyang@jejunu.ac.kr)

Mr. WAQAR, M.  
Jeju National University

Mr. KIM, Yoosung  
Dept. of Nuclear Engineering, Seoul National University  
Email: [yshdgf@snu.ac.kr](mailto:yshdgf@snu.ac.kr)

Mr. PARK Jong Yoon  
Dept. of Nuclear Engineering, Seoul National University,  
Email: [jongblues@snu.ac.kr](mailto:jongblues@snu.ac.kr)

Mr. YANG, Jeong-hun  
Dept. of Nuclear Engineering, Seoul National University  
Email: [yangban@snu.ac.kr](mailto:yangban@snu.ac.kr)

Mr. JO, JongGab  
Dept. of Nuclear Engineering, Seoul National University  
Email: [lsko603@snu.ac.kr](mailto:lsko603@snu.ac.kr)

Mr. CHUNG, Kyoung Soo  
Dept. of Nuclear Engineering, Seoul National University  
Email: [alsk3@snu.ac.kr](mailto:alsk3@snu.ac.kr)

Mr. JO, Jung Min  
Dept. of Nuclear Engineering, Seoul National University  
Email: [wh1223@snu.ac.kr](mailto:wh1223@snu.ac.kr)

Ms. CHOI Dahye  
Dept. of Nuclear Engineering, Seoul National University  
Email: [chd88@snu.ac.kr](mailto:chd88@snu.ac.kr)

Mr. KIM, Young-gi  
Dept. of Nuclear Engineering, Seoul National University  
Email: [john329@snu.ac.kr](mailto:john329@snu.ac.kr)

Mr. YANG SeongMoo  
Dept. of Nuclear Engineering, Seoul National University  
Email: [ysm1887@snu.ac.kr](mailto:ysm1887@snu.ac.kr)

Mr. SOHN Jung Hoon  
Dept. of Nuclear Engineering, Seoul National University  
Email: [nears2002@snu.ac.kr](mailto:nears2002@snu.ac.kr)

Dr. Bongki Jung  
Dept. of Nuclear Engineering, Seoul National University  
Email: [only1881@snu.ac.kr](mailto:only1881@snu.ac.kr)

Mr. Seok-geun Lee  
Dept. of Nuclear Engineering, Seoul National University  
Email: [ssugny1@snu.ac.kr](mailto:ssugny1@snu.ac.kr)

Mr. WonHwi Cho  
Dept. of Nuclear Engineering, Seoul National University  
Email: [whjo05@snu.ac.kr](mailto:whjo05@snu.ac.kr)

Mr. Kern Lee  
Dept. of Nuclear Engineering, Seoul National University  
Email: [magnum7@snu.ac.kr](mailto:magnum7@snu.ac.kr)

Mr. Ji-Sung Kang

Dept. of Nuclear Engineering, Seoul National University

Email: [fatema@snu.ac.kr](mailto:fatema@snu.ac.kr)

Mr. Kyumin Choe

Dept. of Nuclear Engineering, Seoul National University

Email: [kyuminchoe@snu.ac.kr](mailto:kyuminchoe@snu.ac.kr)